

N66-83978**ON THE ORBITAL PERIOD OF ALGOL SYSTEM**

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ABSTRACT

The difference between observed and predicted times of primary minimum is calculated from 1575 observed times of minimum reported between 1782 and 1962. The distribution of residuals between observed and predicted times of minimum shows at least two types of periodic variation in the period of the Algol system, a long and several short terms. The long-term variation has been suspected by early investigators as due to an extra-component star of the system. Its decisive confirmation awaits further observations. However, a refined period of the long term is suggested here as 183.4 years. Calculations based on the methods of Fourier analysis and auto-correlation yield three short-term variations of 31.1, 19.6, and 14.1 years. The 14.1 years term seems to be the most probable one caused by the apsidal motion of the two-body orbit of the system. It is still difficult to give proper dynamical interpretation by means of perturbation or other possible known physical effects for the 31.1 and 19.6 years terms.

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INTRODUCTION

One of the most widely studied problems in the field of eclipsing variables is the orbital period of the Algol system, and the unpredictable variations in period attracted the attention of many astronomers whose investigations have been reported in numerous papers. The historical background of the system and the impressive collection of times of the primary minimum, together with the dynamical analysis, are well summarized by Kopal and his associates (1960).

Eggen's work (1948) also deserves special mention. He studied the distribution of residuals between the observed and predicted times of minimum, and reported two periodic variations of the period of the order of 32 and 188.4 years. This short period term has been suspected by many other investigators. According to Eggen, this term is due to the apsidal motion of the orbit of the two components. The long period term is thought to be due to the existence of an additional component, the fourth body of the system.

TIMES OF MINIMUM

The most extensive collection of published times of minimum of the system is that reported by Kopal and his associates (1960). They were able to collect 1524 useable times of minimum observed from 1782 to 1949. Considering the reports made by Chandler (1901), Hellerich (1919), McLaughlin (1934), and Eggen (1948), they derived a period

$$P(E) = 2.86731197 + 0.0000386 \cos 0^{\circ}0161 (E - 302) \\ + 0.0000142 \cos 0^{\circ}0884 (E + 38) \\ + 0.0000791 \cos 1^{\circ}51 (E - 13144).$$

These periodic terms were obtained by them from a least squares solution of a system of 1537 simultaneous equations properly weighted. Even with the above period, the residuals of the observed times of minimum had an irregular distribution, which made it difficult to define the system's dynamical properties. Thus they had to state, "the principal part of the notorious inequalities in the observed times of light minimum is due to a cause or causes unknown." Later, Wood and Forbes (1963) analyzed the period variation by means of the cubic fit method. The formula they used was as follows:

$$\text{Min. Light} = \text{JD } 2433282.33730 + 2.86732953 E \\ + 0.5902 \times 10^{-8} E^2 \\ + 0.2357 \times 10^{-12} E^3.$$

Residuals between the observed and predicted times of minimum came out to be so irregularly distributed that they could not find any definite evidence for the well known periodicity of the period variation. Perhaps a part of the reason may be that they did not use a sufficient number of times of minimum. They

used 221 minima, about one-seventh of what the Kopal group used.

The author has continued the search for the observed times of minimum from 1950 to date to extend Kopal's collections. 51 times of minimum observed since 1950 were collected, including his own eight observations. The recent photoelectric observations of times of minimum are reported by him (1964).

ANALYSIS OF PERIOD VARIATION

As we see from the above cases, any attempts to use higher order correction terms in the light element for the purpose of finding any conceivable systematic variation in the orbital period of the Algol system seem to have failed. Therefore, adoption of a simple linear light element for the calculation of the residuals between the predicted and observed times of minimum would serve as well for the purpose of reexamining the distribution of the residuals.

The formula adopted is as follows:

$$JD \text{ Hel Min I} = 2372238.370 + 2.867311415 E.$$

The U. S. Naval Observatory's electronic computer is used to carry out the calculations of the residuals. The results are given in Table I. The residuals are plotted against the number of cycles of the period as shown in Figure 1. In general, as predicted by earlier investigators, the distribution of the residuals seems to show a long term periodic variation. In addition, it also seems that small oscillatory variation with a shorter period is superimposed on the long term periodic curve. For a clearer presentation of the distribution of the

residuals, the normal points of the visual observations are obtained. The calculation of the normal points is carried out in such a way that the average value of the residuals within an equal interval of 250 cycles of the system's period, which is equivalent to about two years, is obtained for coordinates. These normal points and individual photoelectric observations are given in Table II. Weights given in the fourth column of the Table II are equivalent to the number of individual observations used to obtain each average value.

Although it is yet difficult to define the variation as one of definite long term periodic nature because of the limited years of observation, an extrapolation of the existing residual curve suggests that the period is 183.4 years with an amplitude of 0.138 day. An attempt is made to compute a theoretical curve by means of the Fourier analysis in an effort to support the above findings.

The residual curve is represented by a Fourier series with 14 harmonics of sine and cosine terms:

$$F(x) = A_0 + A_1 \sin \theta + A_2 \sin 2\theta + \dots + A_7 \sin 7\theta \\ + B_1 \cos \theta + B_2 \cos 2\theta + \dots + B_7 \cos 7\theta$$

where A_i and B_i are Fourier coefficients to be determined. The values of the coefficients calculated are listed in Table III. As we see from Table III, the coefficient of $\sin \theta$ term A_1 is distinctively dominant over the rest except perhaps for the one for the $\cos 2\theta$ term. A comparison between the curve of $A_1 \sin \theta$ and $A_1 \sin \theta + B_2 \cos 2\theta$ is also made, and it shows that the contribution of the $\cos 2\theta$ term with respect to the $\sin \theta$ term is negligible. Figure 2 shows the comparison between the residual and the

computed curves, and it leads us to believe that the long periodic variation certainly exists and that it is closely represented by a sinecurve.

However, the distribution of residuals over the $A_1 \sin \theta$ curve seems to show an additional periodicity of shorter duration. For an inspection of the short period terms, the autocorrelation method is used to determine the values of the periodicity (Sharpless *et al* 1964). All of these calculations are carried out on the Observatory's electronic computer. The algebraic differences between the computed and residual curves are obtained to construct a correlogram. Data used for this computation are those reported from 1850 to 1962 since the reliability and the number of times of minima reported before 1850 are not comparable with those reported later. The results of the correlogram analysis show a strong secondary periodicity of 31.1 years.

A further inspection step is taken to confirm the results by computing a power spectrum (periodogram) of the residuals. The computed profile of the power spectrum, strong evidence of a 31.1 year periodic term is present. It should also be noted that two other periodic terms of 19.6 and 14.1 years appear to be significant. Since the method of the analysis rests on a sound theoretical basis, the above three additional short term periodic variations should be regarded as real and highly accurate. The remaining problem is to give adequate physical interpretations of these terms. Several possibilities are discussed in the following sections.

PROBLEM OF THE FOURTH BODY

Even with the data accumulated in the past 180 years of observations, the residual curve (Figure 1) does not complete a full cycle to show definite evidence of a periodicity of 183.4 years in the period variation of the system. It would require at least 20 years of observations in the future to see whether the residual curve is really of a periodic nature or not. However, if the current trend of the residual curve continues, the long period term of 183.4 years verifies Eggen's point of view (1948) about the fourth body of the system.

Ebbighausen and Gange (1963) reported a newly determined amplitude of the motion of the center of mass of the triple system which is obtained from the measurements of 144 spectra. However, they came up with one puzzling result about the amplitude. When Ebbighausen first obtained the velocity of the system (1958), the value was $+1.4 \pm 0.2$ km/sec. This time the value was $+4.3 \pm 0.3$ km/sec. The difference between these two results, as he admitted, is a statistically significant quantity. On the other hand, Curtis (1908) and McLaughlin (1934) obtained the value +4.1 and +2.2 km sec. respectively. These disagreements might lead to a clue to solve the problem of the extra component of the system. Though any currently available data concerning the system are still not sufficient to prove the periodic motion of the center of mass of the triple system, the author considers the existence of Algol D quite probable on the basis of the residual curve analysis. The value of 183.4 years is suggested here as the best determined period on the basis of currently available data.

PERIOD OF APSIDAL MOTION

The relationship between the orbital period of a close binary system and the period of motion of the line of apsides has been studied by several investigators, Russell (1928-39), Cowling (1938), Kopal (1938), and Stern (1939). Though their theories in a sense contradict each other, it is now believed that the ratio of the above periods is best represented by the following expression:

$$\frac{P}{\pi} = k \left[R_A^5 \left(1 + 16 \frac{m_B}{M_A} \right) + R_B^5 \left(1 + 16 \frac{m_A}{M_B} \right) \right]$$

where π = period of the apsidal motion,
 P = orbital period,
 R_A , R_B = relative radius of components,
 m_A , m_B = mass of components in solar units,
 k = constant which is relative to
the tidal polytropic function
and index.

Let us set the values of the shorter periodic terms as follows:

$$\begin{aligned}\pi_1 &= 31^{\text{Y}}.1 \\ \pi_2 &= 19^{\text{Y}}.1 \\ \pi_3 &= 14^{\text{Y}}.1\end{aligned}$$

The photometric and spectroscopic observations of the system furnish information about the system as follows:

$$\begin{array}{lll}R_A &= 0.21 & m_A = 5.0m_0 \\ R_B &= 0.25 & m_B = 1.0m_0\end{array}$$

By substituting these quantities with $P = 2.867 = 0^{\text{d}}.0079$
into above expression, we will have

$$k_1 = \frac{0.0974}{\pi_1}$$

Accordingly,

$$k_1 = 0.0031 \text{ for } n_1$$

$$k_2 = 0.0050 \text{ for } n_2$$

$$k_3 = 0.0070 \text{ for } n_3$$

The theory of the polytropic model indicates that the value of k is 0.75 for a homogeneous star, and zero for the Roche model, which is a case of central condensation of all mass of the star. The relationship between the polytropic index n and k is known by the work done by Chandrasekhar as shown in Table IV. From the table, k_1 gives the corresponding n as follows:

$$n_1 = 3.7$$

$$n_2 = 3.4$$

$$n_3 = 3.3$$

The density distribution of the stellar interior is believed to be close to Emden's model with the polytropic index, n , equals 3, which is similar to the Eddington model. This might mean that the shortest period term, n_3 , which gives the mean central density of the component stars in a state of $n = 3.3$, is closer to reality. In other words, the 14.1 years term is the most probable value for the period of apsidal motion of the two body orbit.

The amplitude of the 14.1 years term curve is of the order of 0.004 day. If we assume that this is due to the rotation of the line of apsides of the orbit, then we have a relation:

$$\frac{O - C}{P} \sim \frac{e}{\pi}$$

where P is the orbital period. This yields a value of the eccentricity of the orbit, $e = 0.044$, which is reasonably close to the McLaughlin value, 0.033 (1934). Therefore, the 14.1 years term should be

regarded as due to the apsidal motion of the orbit.

A CASE OF MASS LOSS

One possible mechanism to cause the variation of orbital period of a close binary system is due to a loss of mass from any of the component stars by an ejection process, and it was first suggested by Wood (1950). Huruhata (1959) derived a formula based on Wood's theory and tried to apply it for the case of *i* Bootis. He failed to notice any apparent luminosity change due to the expected flare-like mass ejection. On the other hand, Huang (1963) extended Wood's theory, and formulated expressions in terms of mass ejection, namely high, intermediate, and low velocity modes. According to him, the probability of mass ejection with low velocity is high for many cases of Algol-type stars.

In the case of the Algol system, the spectral types of the primary and secondary components are known to be B8V and KOIV, respectively. Since the intrinsic variability is more probable for the secondary component of the system because of its late spectral type, an assumption is made that an ejection of mass from the primary component would not take place. Therefore, according to Huang's theory, an equation can be written as

$$\frac{\Delta P}{P} = -3 \left(\frac{m_A - m_B}{m_A} \right) \frac{\Delta m_B}{m_B} + \frac{3e\Delta e}{1 - e^2}$$

where P , m_A , m_B , and e are the period, masses of the components, and eccentricity of the orbit, respectively. The photoelectric observations of the system so far made could not trace any noticeable eccentricity of the orbit. In other words, the last term on the right hand side of the above equation

may be neglected. As a result of the substitution of the physical quantities into the equation, we get

$$\Delta m_B \cong -0.4 \frac{\Delta P}{P}$$

The recent observations indicate that the period of the system has been increasing with a rate of about 0.005 day per year. The corresponding amount of mass loss thus becomes

$$\Delta m_B \cong -5.6 \times 10^{-6} m_0/\text{year.}$$

This is a quite feasible value for the system compared with the results reported by the above investigators. If the ejected mass is not dissipated into the space but is caught by the primary component to form a gaseous ring around it, accurate photometric observations should be able to detect a change in the light curve due to the ring only at the beginning and after the eclipsing phase. Therefore, the above calculations await a test by the future observations of the light curve.

Dommangé (1963) made an interesting analysis concerning the changes in the orbital elements due to the variation of mass of the binary system. Starting from Kepler's equation, he derived a simple formula for the variation of the period ΔP as follows:

$$\Delta P = 4\pi K P^2$$

where $K = \frac{1}{2\pi} \left(\frac{dm}{dt} \cdot \frac{1}{m_A + m_B} \right)$

If we assume the annual rate of mass loss to be what we obtain from Huang's method, the amount of period variation over a year becomes 3×10^{-7} days per year. If we adopt the current observed period variation, 0.005

day per year, the amount of mass loss becomes $0.7m_0$ per year. The result is far beyond the acceptable limit. Perhaps, his method may not be applicable to the Algol case.

A problem still remained to identify for which of the remaining periodic terms of 31.1 and 19.6 years would this mass loss mechanism be responsible. Some abrupt changes in the period have been reported, as summarized by the author (1964). A part of this complexity may be interpreted as due to the mass loss effect.

L DISTURBING EFFECT OF THIRD BODY

The application of the three body problems to the Algol system was first introduced by Lyttleton (1935). He treated the problem in the same way that the lunar problem was solved in de Pontecoulant's method. He showed that the solution of the perturbative function derived for the case of the orbital period can be reduced to an expression similar to that of an empirical formula of the period given by Hellerich (1919). His analysis showed that the perturbative force by the third body can produce several periodic terms in the period P_r at the rth cycle from an epoch time as follows:

$$\begin{aligned}
 P_r = & C_0 + \frac{2\pi}{n}r + \frac{2e}{n} \sin \left(\frac{3}{2}\pi\lambda\phi^2 r + C_1 \right) \\
 & - 3\lambda\phi \frac{e'}{n} \sin \left(2\pi\phi r + C_2 \right) \\
 & - \frac{9}{4}\lambda\phi \frac{e'}{n} \sin \left(4\pi\phi r + C_3 \right) \\
 & + \lambda \left(1 - \frac{1}{2}e'^2 \right) \frac{a'}{c} \cos \left(2\pi\phi r + C_4 \right) \\
 & + \frac{1}{2}\lambda e' \frac{a'}{c} \cos \left(4\pi\phi r + C_5 \right) \\
 & + \dots
 \end{aligned}$$

where n = mean orbital motion,

$$\lambda = \frac{m}{m_A + m_B + m_C},$$

ϕ = ratio between the two body and the third body orbit,

e = eccentricity of the two body orbit,

e' , a' = eccentricity and semi-major axis of the third body orbit with respect to the center of mass m_A and m_B ,

c = velocity of light,

and C_0 , C_1 , C_2 ,..... = constants.

In case of Algol, the values of the above quantities are calculated on the basis of the observations of McLaughlin and of the author. The substitution of the following quantities:

$$\frac{2\pi}{n} = 2.8673$$

$$\phi = 0.00419$$

$$\lambda = 0.21$$

$$e = 0.033$$

$$e' = 0.26$$

$$a' = 300c$$

yields an expression as follows:

$$\begin{aligned} P_r = C_0 &+ 2.86731 + 0.03 \sin 0^{\circ}0010 (r - C_1) \\ &- 0.00099 \sin 1^{\circ}5 (r - C_2) \\ &- 0.00015 \sin 3^{\circ} (r - C_3) \end{aligned}$$

As we judge from this final expression, it indicates that the period of the first term is in the order of about 2800 years, while that of the second

periodic term is 1.88 years, which is equivalent to the period of the third body. The period of the third term is just under one year. The result for the first term is so large that there is no way of checking this periodicity against our currently available data. On the other hand, the third term is so small in both amplitude and period that it is also difficult to identify in the observed data. Since Lyttleton derived the formula with an assumption that the orbits of the component stars are all in the same plane, the results should be regarded as very approximate.

Kopal (1959) introduced an extended theory of orbital motion of multiple star systems which takes into account the inclination of the orbit. The solution of the disturbing function in this case consists of various and lengthy polynomials. In fact, the currently available value of the inclination of the third body orbit is not so highly reliable that a lengthy calculation based on the extended theory would not be more rewarding than that obtained from Lyttleton's formula. Therefore, the further calculation is not tried here.

SUMMARY

Even with the large number of observational data, the causes of the period variation of the system can not be fully explained with the currently known physical principles. This is partly because we still do not have enough of the necessary observations to perfect the analysis. However, the following conclusions are drawn upon the analysis made on the basis of the currently available data.

1. A long term variation in the period can best be represented by a sinusoidal curve with a period of 183.4 years and amplitude of 0.138 day. The decisive confirmation for the existence of Algol D awaits further observations.

2. The most probable rotational period of the line of apsides of the system's two body orbit, caused by the distortion of the components, is 14.1 years.

3. It is believed that the mass loss mechanism is partly responsible for the abrupt period variation. It will require about $5.6 \times 10^{-6} m_{\odot}$ /year of mass loss for the 0.005 day/year period variation.

4. The theory of the disturbing effect of the third body predicts three conceivable periodic terms of the order of 2800 years, 1.88 years, and just under one year. Since these are the results of a limited solution, high reliability of the values can not be claimed.

5. The physical interpretation of the prominent short term periodicities, of the order of 31.1 and 19.6 years, are yet to be made. Unfortunately, the author finds it difficult to give convincing reasons for the causes of these periodicities. As Kopal (1960) stated before, perhaps it may be due to "the causes known or causes unknown." Only further observations of the system will open a clue for the better understanding of this type of behavior.

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Table I
TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
1	237 2238.351	237 2238.370	0	-0.019
2	237 2284.237	237 2284.247	16	-0.010
3	237 2301.397	237 2301.451	22	-0.054
4	237 2318.607	237 2318.655	28	-0.048
5	237 2324.350	237 2324.389	30	-0.039
6	237 2341.510	237 2341.593	36	-0.083
7	237 2344.406	237 2344.461	37	-0.055
8	237 2367.360	237 2367.399	45	-0.039
9	237 2387.420	237 2387.470	52	-0.050
10	237 2390.330	237 2390.338	53	-0.008
11	237 2410.381	237 2410.409	60	-0.028
12	237 2410.371	237 2410.409	60	-0.038
13	237 2427.600	237 2427.613	66	-0.013
14	237 2436.541	237 2436.214	69	+0.327
15	237 2447.599	237 2447.684	73	-0.085
16	237 2470.568	237 2470.622	81	-0.054
17	237 2496.431	237 2496.428	90	+0.003
18	237 2496.444	237 2496.428	90	+0.016
19	237 2516.474	237 2516.499	97	-0.025
20	237 2516.463	237 2516.499	97	-0.036
21	237 2516.458	237 2516.499	97	-0.041
22	237 2516.477	237 2516.499	97	-0.022
23	237 2539.403	237 2539.438	105	-0.035
24	237 2539.406	237 2539.438	105	-0.032
25	237 2539.399	237 2539.438	105	-0.039
26	237 2542.300	237 2542.305	106	-0.005
27	237 2559.469	237 2559.509	112	-0.040
28	237 2559.474	237 2559.509	112	-0.035
29	237 2565.251	237 2565.244	114	+0.007
30	237 2579.590	237 2579.580	119	+0.010
31	237 2582.470	237 2582.447	120	+0.023
32	237 2582.414	237 2582.447	120	-0.033
33	237 2585.285	237 2585.315	121	-0.030
34	237 2585.340	237 2585.315	121	+0.025
35	237 2585.292	237 2585.315	121	-0.023
36	237 2602.477	237 2602.519	127	-0.042
37	237 2605.353	237 2605.386	128	-0.033
38	237 2605.440	237 2605.386	128	+0.054
39	237 2608.211	237 2608.253	129	-0.042
40	237 2608.231	237 2608.253	129	-0.022

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE CBSERVED	JUL. DATE CALCULATED	E	(O-C)
41	237 2631.174	237 2631.192	137	-0.018
42	237 2860.544	237 2860.577	217	-0.033
43	237 2886.369	237 2886.382	226	-0.013
44	237 2886.350	237 2886.382	226	-0.032
45	237 2903.555	237 2903.586	232	-0.031
46	237 2906.423	237 2906.454	233	-0.031
47	237 2909.291	237 2909.321	234	-0.030
48	237 2909.294	237 2909.321	234	-0.027
49	237 2926.485	237 2926.525	240	-0.040
50	237 2935.414	237 2935.127	243	+0.287
51	237 2972.380	237 2972.402	256	-0.022
52	237 2975.251	237 2975.269	257	-0.018
53	237 3081.328	237 3081.360	294	-0.032
54	237 3207.496	237 3207.521	338	-0.025
55	237 3230.415	237 3230.460	346	-0.045
56	237 3270.579	237 3270.602	360	-0.023
57	237 3273.451	237 3273.469	361	-0.018
58	237 3273.442	237 3273.469	361	-0.027
59	237 3405.345	237 3405.366	407	-0.021
60	237 3620.395	237 3620.414	482	-0.019
61	237 4093.504	237 4093.520	647	-0.016
62	237 4397.447	237 4397.455	753	-0.008
63	237 4420.357	237 4420.394	761	-0.037
64	237 4420.356	237 4420.394	761	-0.038
65	237 4420.379	237 4420.394	761	-0.015
66	237 4423.235	237 4423.261	762	-0.026
67	237 4440.440	237 4440.465	768	-0.025
68	237 4443.316	237 4443.332	769	-0.016
69	237 4443.324	237 4443.332	769	-0.008
70	237 4466.260	237 4466.271	777	-0.011
71	237 4853.377	237 4853.358	912	+0.019
72	237 4853.346	237 4853.358	912	-0.012
73	237 4876.304	237 4876.297	920	+0.007
74	237 4893.486	237 4893.500	926	-0.014
75	237 4896.354	237 4896.368	927	-0.014
76	237 4896.354	237 4896.368	927	-0.014
77	237 4916.440	237 4916.439	934	+0.001
78	237 4919.297	237 4919.306	935	-0.009
79	237 4939.372	237 4939.377	942	-0.005
80	237 5134.359	237 5134.355	1010	+0.004

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
81	237 5197.445	237 5197.435	1032	+0.010
82	237 5481.306	237 5481.299	1131	+0.007
83	237 5630.402	237 5630.399	1183	+0.003
84	237 6192.398	237 6192.392	1379	+0.006
85	237 6192.390	237 6192.392	1379	-0.002
86	237 6926.449	237 6926.424	1635	+0.025
87	237 6929.317	237 6929.291	1636	+0.026
88	237 6972.315	237 6972.301	1651	+0.014
89	237 7273.393	237 7273.369	1756	+0.024
90	237 7448.292	237 7448.275	1817	+0.017
91	237 7597.530	237 7597.375	1869	+0.155
92	237 7663.352	237 7663.323	1892	+0.029
93	237 7789.512	237 7789.485	1936	+0.027
94	237 7812.444	237 7812.423	1944	+0.021
95	237 7815.330	237 7815.291	1945	+0.039
96	237 7835.388	237 7835.362	1952	+0.026
97	237 7858.325	237 7858.300	1960	+0.025
98	237 8030.370	237 8030.339	2020	+0.031
99	237 8076.240	237 8076.216	2036	+0.024
100	237 8225.345	237 8225.316	2088	+0.029
101	237 8549.385	237 8549.322	2201	+0.063
102	237 9260.429	237 9260.416	2449	+0.013
103	237 9343.345	237 9343.568	2478	-0.223
104	237 9501.286	237 9501.270	2533	+0.016
105	237 9673.358	237 9673.308	2593	+0.050
106	237 9859.252	237 9859.684	2658	-0.432
107	237 9882.305	237 9882.622	2666	-0.317
108	238 0238.300	238 0238.169	2790	+0.131
109	238 0367.304	238 0367.198	2835	+0.106
110	238 0582.316	238 0582.246	2910	+0.070
111	238 0625.318	238 0625.256	2925	+0.062
112	238 1660.405	238 1660.355	3286	+0.050
113	238 2007.395	238 2007.300	3407	+0.095
114	238 2417.404	238 2417.326	3550	+0.078
115	238 3564.334	238 3564.250	3950	+0.084
116	238 3934.234	238 3934.133	4079	+0.101
117	238 4235.301	238 4235.201	4184	+0.100
118	238 5012.351	238 5012.242	4455	+0.109
119	238 5012.348	238 5012.242	4455	+0.106
120	238 5035.288	238 5035.181	4463	+0.107

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
121	238 5336.356	238 5336.249	4568	+0.107
122	238 5614.474	238 5614.378	4665	+0.096
123	238 5703.386	238 5703.264	4696	+0.122
124	238 5726.326	238 5726.203	4704	+0.123
125	238 5878.279	238 5878.170	4757	+0.109
126	238 6027.383	238 6027.271	4809	+0.112
127	238 6050.324	238 6050.209	4817	+0.115
128	238 7151.379	238 7151.257	5201	+0.122
129	238 7673.267	238 7673.107	5383	+0.160
130	238 7693.320	238 7693.179	5390	+0.141
131	238 7908.366	238 7908.227	5465	+0.139
132	238 7908.354	238 7908.227	5465	+0.127
133	238 8060.342	238 8060.194	5518	+0.148
134	238 8295.445	238 8295.314	5600	+0.131
135	238 9505.483	238 9505.319	6022	+0.164
136	238 9654.556	238 9654.420	6074	+0.136
137	239 0179.299	239 0179.138	6257	+0.161
138	239 0219.447	239 0219.280	6271	+0.167
139	239 3158.456	239 3158.274	7296	+0.182
140	239 3161.327	239 3161.141	7297	+0.186
141	239 3350.577	239 3350.384	7363	+0.193
142	239 3376.385	239 3376.190	7372	+0.195
143	239 3396.444	239 3396.261	7379	+0.183
144	239 3459.544	239 3459.342	7401	+0.202
145	239 3462.415	239 3462.209	7402	+0.206
146	239 3465.244	239 3465.076	7403	+0.168
147	239 3548.410	239 3548.228	7432	+0.182
148	239 3697.527	239 3697.329	7484	+0.198
149	239 3743.393	239 3743.206	7500	+0.187
150	239 3763.454	239 3763.277	7507	+0.177
151	239 4130.489	239 4130.293	7635	+0.196
152	239 4173.495	239 4173.302	7650	+0.193
153	239 4176.360	239 4176.170	7651	+0.190
154	239 4176.349	239 4176.170	7651	+0.179
155	239 4196.411	239 4196.241	7658	+0.170
156	239 4222.249	239 4222.047	7667	+0.202
157	239 4457.356	239 4457.166	7749	+0.190
158	239 4589.263	239 4589.062	7795	+0.201
159	239 5234.396	239 5234.208	8020	+0.188
160	239 5257.325	239 5257.146	8028	+0.179

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE CBSERVED	JUL. DATE CALCULATED	E	(O-C)
161	239 5280.307	239 5280.085	8036	+0.222
162	239 5300.330	239 5300.156	8043	+0.174
163	239 5512.506	239 5512.337	8117	+0.169
164	239 5535.461	239 5535.275	8125	+0.186
165	239 5558.387	239 5558.214	8133	+0.173
166	239 5948.344	239 5948.168	8269	+0.176
167	239 5948.366	239 5948.168	8269	+0.198
168	239 5968.406	239 5968.239	8276	+0.167
169	239 5968.414	239 5968.239	8276	+0.175
170	239 5968.417	239 5968.239	8276	+0.178
171	239 5971.290	239 5971.107	8277	+0.183
172	239 5971.278	239 5971.107	8277	+0.171
173	239 5971.272	239 5971.107	8277	+0.165
174	239 6008.572	239 6008.382	8290	+0.190
175	239 6014.294	239 6014.116	8292	+0.178
176	239 6031.483	239 6031.320	8298	+0.163
177	239 6034.357	239 6034.187	8299	+0.170
178	239 6034.346	239 6034.187	8299	+0.159
179	239 6034.359	239 6034.187	8299	+0.172
180	239 6037.221	239 6037.055	8300	+0.166
181	239 6037.222	239 6037.055	8300	+0.167
182	239 6037.228	239 6037.055	8300	+0.173
183	239 6054.428	239 6054.259	8306	+0.169
184	239 6054.423	239 6054.259	8306	+0.164
185	239 6054.419	239 6054.259	8306	+0.160
186	239 6292.404	239 6292.245	8389	+0.159
187	239 6616.421	239 6616.252	8502	+0.169
188	239 6636.538	239 6636.323	8509	+0.215
189	239 6662.292	239 6662.129	8518	+0.163
190	239 6662.290	239 6662.129	8518	+0.161
191	239 6685.224	239 6685.067	8526	+0.157
192	239 6702.436	239 6702.271	8532	+0.165
193	239 6725.379	239 6725.209	8540	+0.170
194	239 6771.250	239 6771.086	8556	+0.164
195	239 6788.446	239 6788.290	8562	+0.156
196	239 6788.457	239 6788.290	8562	+0.167
197	239 6814.254	239 6814.096	8571	+0.158
198	239 7095.248	239 7095.093	8669	+0.155
199	239 7138.260	239 7138.102	8684	+0.158
200	239 7178.420	239 7178.245	8698	+0.175

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
201	239 7178.423	239 7178.245	8698	+0.178
202	239 7178.412	239 7178.245	8698	+0.167
203	239 7373.384	239 7373.222	8766	+0.162
204	239 7393.445	239 7393.293	8773	+0.152
205	239 7416.396	239 7416.232	8781	+0.164
206	239 7565.483	239 7565.332	8833	+0.151
207	239 7568.360	239 7568.199	8834	+0.161
208	239 7568.346	239 7568.199	8834	+0.147
209	239 7694.518	239 7694.361	8878	+0.157
210	239 7740.401	239 7740.238	8894	+0.163
211	239 7826.421	239 7826.257	8924	+0.164
212	239 7846.496	239 7846.328	8931	+0.168
213	239 7846.501	239 7846.328	8931	+0.173
214	239 7889.530	239 7889.338	8946	+0.192
215	239 7892.368	239 7892.205	8947	+0.163
216	239 8081.616	239 8081.448	9013	+0.168
217	239 8130.341	239 8130.192	9030	+0.149
218	239 8130.366	239 8130.192	9030	+0.174
219	239 8150.420	239 8150.263	9037	+0.157
220	239 8150.418	239 8150.263	9037	+0.155
221	239 8150.405	239 8150.263	9037	+0.142
222	239 8150.425	239 8150.263	9037	+0.162
223	239 8153.284	239 8153.131	9038	+0.153
224	239 8153.272	239 8153.131	9038	+0.141
225	239 8170.485	239 8170.334	9044	+0.151
226	239 8170.487	239 8170.334	9044	+0.153
227	239 8173.357	239 8173.202	9045	+0.155
228	239 8190.556	239 8190.406	9051	+0.150
229	239 8193.411	239 8193.273	9052	+0.138
230	239 8199.169	239 8199.008	9054	+0.161
231	239 8213.476	239 8213.344	9059	+0.132
232	239 8213.494	239 8213.344	9059	+0.150
233	239 8216.362	239 8216.211	9060	+0.151
234	239 8232.188	239 8233.415	9066	-0.227
235	239 8239.292	239 8239.150	9068	+0.142
236	239 8279.502	239 8279.292	9082	+0.210
237	239 8279.445	239 8279.292	9082	+0.153
238	239 8279.439	239 8279.292	9082	+0.147
239	239 8282.304	239 8282.160	9083	+0.144
240	239 8282.301	239 8282.160	9083	+0.141

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
241	239 8299.510	239 8299.363	9089	+0.147
242	239 8302.394	239 8302.231	9090	+0.163
243	239 8448.622	239 8448.464	9141	+0.158
244	239 8451.472	239 8451.331	9142	+0.141
245	239 8451.462	239 8451.331	9142	+0.131
246	239 8451.472	239 8451.331	9142	+0.141
247	239 8471.554	239 8471.402	9149	+0.152
248	239 8471.553	239 8471.402	9149	+0.151
249	239 8474.424	239 8474.269	9150	+0.155
250	239 8474.408	239 8474.269	9150	+0.139
251	239 8474.430	239 8474.269	9150	+0.161
252	239 8474.416	239 8474.269	9150	+0.147
253	239 8474.423	239 8474.269	9150	+0.154
254	239 8491.618	239 8491.473	9156	+0.145
255	239 8494.488	239 8494.341	9157	+0.147
256	239 8494.488	239 8494.341	9157	+0.147
257	239 8494.490	239 8494.341	9157	+0.149
258	239 8494.496	239 8494.341	9157	+0.155
259	239 8494.499	239 8494.341	9157	+0.158
260	239 8494.499	239 8494.341	9157	+0.158
261	239 8494.499	239 8494.341	9157	+0.158
262	239 8514.560	239 8514.412	9164	+0.148
263	239 8514.552	239 8514.412	9164	+0.140
264	239 8520.292	239 8520.146	9166	+0.146
265	239 8520.300	239 8520.146	9166	+0.154
266	239 8520.229	239 8520.146	9166	+0.083
267	239 8520.303	239 8520.146	9166	+0.157
268	239 8520.294	239 8520.146	9166	+0.148
269	239 8523.165	239 8523.014	9167	+0.151
270	239 8537.494	239 8537.350	9172	+0.144
271	239 8540.371	239 8540.218	9173	+0.153
272	239 8560.428	239 8560.289	9180	+0.139
273	239 8560.435	239 8560.289	9180	+0.146
274	239 8560.440	239 8560.289	9180	+0.151
275	239 8560.431	239 8560.289	9180	+0.142
276	239 8563.292	239 8563.156	9181	+0.136
277	239 8563.311	239 8563.156	9181	+0.155
278	239 8563.344	239 8563.156	9181	+0.188
279	239 8580.526	239 8580.360	9187	+0.166
280	239 8580.504	239 8580.360	9187	+0.144

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
281	239 8580.505	239 8580.360	9187	+0.145
282	239 8603.446	239 8603.298	9195	+0.148
283	239 8603.440	239 8603.298	9195	+0.142
284	239 8603.440	239 8603.298	9195	+0.142
285	239 8603.440	239 8603.298	9195	+0.142
286	239 8603.445	239 8603.298	9195	+0.147
287	239 8606.312	239 8606.166	9196	+0.146
288	239 8606.317	239 8606.166	9196	+0.151
289	239 8606.332	239 8606.166	9196	+0.166
290	239 8623.508	239 8623.370	9202	+0.138
291	239 8643.587	239 8643.441	9209	+0.146
292	239 8646.454	239 8646.308	9210	+0.146
293	239 8746.804	239 8746.664	9245	+0.140
294	239 8818.498	239 8818.347	9270	+0.151
295	239 8832.817	239 8832.683	9275	+0.134
296	239 8835.689	239 8835.551	9276	+0.138
297	239 8838.557	239 8838.418	9277	+0.139
298	239 8838.563	239 8838.418	9277	+0.145
299	239 8864.372	239 8864.224	9286	+0.148
300	239 8887.379	239 8887.162	9294	+0.217
301	239 8901.631	239 8901.499	9299	+0.132
302	239 8907.412	239 8907.233	9301	+0.179
303	239 8907.377	239 8907.233	9301	+0.144
304	239 8924.569	239 8924.437	9307	+0.132
305	239 8933.253	239 8933.039	9310	+0.214
306	239 8950.388	239 8950.243	9316	+0.145
307	239 8976.209	239 8976.049	9325	+0.160
308	239 8996.265	239 8996.120	9332	+0.145
309	239 8996.262	239 8996.120	9332	+0.142
310	239 9016.362	239 9016.191	9339	+0.171
311	239 9016.334	239 9016.191	9339	+0.143
312	239 9016.338	239 9016.191	9339	+0.147
313	239 9036.400	239 9036.262	9346	+0.138
314	239 9036.404	239 9036.262	9346	+0.142
315	239 9036.398	239 9036.262	9346	+0.136
316	239 9036.392	239 9036.262	9346	+0.130
317	239 9059.378	239 9059.201	9354	+0.177
318	239 9162.568	239 9162.424	9390	+0.144
319	239 9162.560	239 9162.424	9390	+0.136
320	239 9165.436	239 9165.291	9391	+0.145

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
321	239 9165.445	239 9165.291	9391	+0.154
322	239 9225.645	239 9225.505	9412	+0.140
323	239 9228.515	239 9228.372	9413	+0.143
324	239 9248.576	239 9248.444	9420	+0.132
325	239 9248.571	239 9248.444	9420	+0.127
326	239 9251.447	239 9251.311	9421	+0.136
327	239 9251.458	239 9251.311	9421	+0.147
328	239 9251.457	239 9251.311	9421	+0.146
329	239 9254.322	239 9254.178	9422	+0.144
330	239 9254.315	239 9254.178	9422	+0.137
331	239 9254.323	239 9254.178	9422	+0.145
332	239 9254.317	239 9254.178	9422	+0.139
333	239 9254.327	239 9254.178	9422	+0.149
334	239 9254.315	239 9254.178	9422	+0.137
335	239 9254.313	239 9254.178	9422	+0.135
336	239 9262.922	239 9262.780	9425	+0.142
337	239 9265.784	239 9265.647	9426	+0.137
338	239 9288.722	239 9288.586	9434	+0.136
339	239 9291.592	239 9291.453	9435	+0.139
340	239 9291.592	239 9291.453	9435	+0.139
341	239 9314.527	239 9314.392	9443	+0.135
342	239 9317.401	239 9317.259	9444	+0.142
343	239 9317.401	239 9317.259	9444	+0.142
344	239 9317.396	239 9317.259	9444	+0.137
345	239 9317.397	239 9317.259	9444	+0.138
346	239 9337.521	239 9337.330	9451	+0.191
347	239 9340.390	239 9340.197	9452	+0.193
348	239 9357.539	239 9357.401	9458	+0.138
349	239 9360.412	239 9360.269	9459	+0.143
350	239 9360.428	239 9360.269	9459	+0.159
351	239 9360.408	239 9360.269	9459	+0.139
352	239 9360.411	239 9360.269	9459	+0.142
353	239 9363.278	239 9363.136	9460	+0.142
354	239 9363.262	239 9363.136	9460	+0.126
355	239 9380.477	239 9380.340	9466	+0.137
356	239 9552.512	239 9552.379	9526	+0.133
357	239 9552.510	239 9552.379	9526	+0.131
358	239 9569.715	239 9569.582	9532	+0.133
359	239 9575.448	239 9575.317	9534	+0.131
360	239 9575.440	239 9575.317	9534	+0.123

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
361	239 9575.454	239 9575.317	9534	+0.137
362	239 9575.449	239 9575.317	9534	+0.132
363	239 9592.652	239 9592.521	9540	+0.131
364	239 9595.520	239 9595.388	9541	+0.132
365	239 9595.523	239 9595.388	9541	+0.135
366	239 9601.263	239 9601.123	9543	+0.140
367	239 9609.858	239 9609.725	9546	+0.133
368	239 9615.610	239 9615.459	9548	+0.151
369	239 9618.460	239 9618.327	9549	+0.133
370	239 9618.477	239 9618.327	9549	+0.150
371	239 9621.324	239 9621.194	9550	+0.130
372	239 9624.185	239 9624.061	9551	+0.124
373	239 9629.931	239 9629.796	9553	+0.135
374	239 9638.531	239 9638.398	9556	+0.133
375	239 9638.524	239 9638.398	9556	+0.126
376	239 9638.518	239 9638.398	9556	+0.120
377	239 9638.531	239 9638.398	9556	+0.133
378	239 9641.396	239 9641.265	9557	+0.131
379	239 9644.272	239 9644.133	9558	+0.139
380	239 9661.472	239 9661.336	9564	+0.136
381	239 9664.334	239 9664.204	9565	+0.130
382	239 9684.414	239 9684.275	9572	+0.139
383	239 9684.410	239 9684.275	9572	+0.135
384	239 9687.288	239 9687.142	9573	+0.146
385	239 9687.283	239 9687.142	9573	+0.141
386	239 9687.285	239 9687.142	9573	+0.143
387	239 9701.604	239 9701.479	9578	+0.125
388	239 9707.350	239 9707.213	9580	+0.137
389	239 9707.342	239 9707.213	9580	+0.129
390	239 9707.365	239 9707.213	9580	+0.152
391	239 9710.222	239 9710.081	9581	+0.141
392	239 9727.431	239 9727.285	9587	+0.146
393	239 9730.286	239 9730.152	9588	+0.134
394	239 9730.266	239 9730.152	9588	+0.114
395	239 9730.299	239 9730.152	9588	+0.147
396	239 9744.615	239 9744.488	9593	+0.127
397	239 9750.360	239 9750.223	9595	+0.137
398	239 9750.355	239 9750.223	9595	+0.132
399	239 9767.558	239 9767.427	9601	+0.131
400	239 9899.440	239 9899.323	9647	+0.117

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
401	239 9899.456	239 9899.323	9647	+0.133
402	239 9936.723	239 9936.598	9660	+0.125
403	239 9945.351	239 9945.200	9663	+0.151
404	239 9959.667	239 9959.537	9668	+0.130
405	239 9962.533	239 9962.404	9669	+0.129
406	239 9962.543	239 9962.404	9669	+0.139
407	239 9965.413	239 9965.271	9670	+0.142
408	239 9965.403	239 9965.271	9670	+0.132
409	239 9968.261	239 9968.139	9671	+0.122
410	239 9979.733	239 9979.608	9675	+0.125
411	239 9988.344	239 9988.210	9678	+0.134
412	240 0005.542	240 0005.414	9684	+0.128
413	240 0025.607	240 0025.485	9691	+0.122
414	240 0031.362	240 0031.220	9693	+0.142
415	240 0034.213	240 0034.087	9694	+0.126
416	240 0042.815	240 0042.689	9697	+0.126
417	240 0051.432	240 0051.291	9700	+0.141
418	240 0068.619	240 0068.495	9706	+0.124
419	240 0071.482	240 0071.362	9707	+0.120
420	240 0074.353	240 0074.229	9708	+0.124
421	240 0077.210	240 0077.097	9709	+0.113
422	240 0088.688	240 0088.566	9713	+0.122
423	240 0114.494	240 0114.372	9722	+0.122
424	240 0120.228	240 0120.106	9724	+0.122
425	240 0134.561	240 0134.443	9729	+0.118
426	240 0140.302	240 0140.177	9731	+0.125
427	240 0243.516	240 0243.401	9767	+0.115
428	240 0243.521	240 0243.401	9767	+0.120
429	240 0266.474	240 0266.339	9775	+0.135
430	240 0266.467	240 0266.339	9775	+0.128
431	240 0280.794	240 0280.676	9780	+0.118
432	240 0283.658	240 0283.543	9781	+0.115
433	240 0289.384	240 0289.278	9783	+0.106
434	240 0300.865	240 0300.747	9787	+0.118
435	240 0306.592	240 0306.481	9789	+0.111
436	240 0309.472	240 0309.349	9790	+0.123
437	240 0332.428	240 0332.287	9798	+0.141
438	240 0335.280	240 0335.155	9799	+0.125
439	240 0352.488	240 0352.358	9805	+0.130
440	240 0352.484	240 0352.358	9805	+0.126

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
441	240 0352.478	240 0352.358	9805	+0.120
442	240 0352.487	240 0352.358	9805	+0.129
443	240 0352.488	240 0352.358	9805	+0.130
444	240 0355.354	240 0355.226	9806	+0.128
445	240 0355.342	240 0355.226	9806	+0.116
446	240 0355.342	240 0355.226	9806	+0.116
447	240 0355.347	240 0355.226	9806	+0.121
448	240 0358.205	240 0358.093	9807	+0.112
449	240 0375.419	240 0375.297	9813	+0.122
450	240 0378.283	240 0378.164	9814	+0.119
451	240 0381.172	240 0381.032	9815	+0.140
452	240 0392.612	240 0392.501	9819	+0.111
453	240 0395.479	240 0395.368	9820	+0.111
454	240 0412.688	240 0412.572	9826	+0.116
455	240 0415.551	240 0415.439	9827	+0.112
456	240 0424.199	240 0424.041	9830	+0.158
457	240 0455.696	240 0455.582	9841	+0.114
458	240 0458.564	240 0458.449	9842	+0.115
459	240 0464.314	240 0464.184	9844	+0.130
460	240 0464.298	240 0464.184	9844	+0.114
461	240 0464.292	240 0464.184	9844	+0.108
462	240 0481.501	240 0481.387	9850	+0.114
463	240 0487.235	240 0487.122	9852	+0.113
464	240 0487.241	240 0487.122	9852	+0.119
465	240 0507.309	240 0507.193	9859	+0.116
466	240 0633.487	240 0633.355	9903	+0.132
467	240 0636.341	240 0636.222	9904	+0.119
468	240 0653.551	240 0653.426	9910	+0.125
469	240 0656.430	240 0656.293	9911	+0.137
470	240 0659.302	240 0659.161	9912	+0.141
471	240 0667.878	240 0667.763	9915	+0.115
472	240 0670.754	240 0670.630	9916	+0.124
473	240 0676.485	240 0676.365	9918	+0.120
474	240 0679.365	240 0679.232	9919	+0.133
475	240 0682.245	240 0682.099	9920	+0.146
476	240 0690.819	240 0690.701	9923	+0.118
477	240 0696.564	240 0696.436	9925	+0.128
478	240 0702.308	240 0702.170	9927	+0.138
479	240 0702.301	240 0702.170	9927	+0.131
480	240 0722.363	240 0722.242	9934	+0.121

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
481	240 0742.451	240 0742.313	9941	+0.138
482	240 0745.300	240 0745.180	9942	+0.120
483	240 0756.767	240 0756.649	9946	+0.118
484	240 0759.630	240 0759.517	9947	+0.113
485	240 0762.503	240 0762.384	9948	+0.119
486	240 0765.383	240 0765.251	9949	+0.132
487	240 0768.247	240 0768.119	9950	+0.128
488	240 0785.427	240 0785.322	9956	+0.105
489	240 0791.187	240 0791.057	9958	+0.130
490	240 0805.506	240 0805.394	9963	+0.112
491	240 0808.374	240 0808.261	9964	+0.113
492	240 0811.233	240 0811.128	9965	+0.105
493	240 0828.445	240 0828.332	9971	+0.113
494	240 0874.310	240 0874.209	9987	+0.101
495	240 0957.489	240 0957.361	10016	+0.128
496	240 0994.745	240 0994.636	10029	+0.109
497	240 0997.577	240 0997.503	10030	+0.074
498	240 1000.488	240 1000.371	10031	+0.117
499	240 1003.360	240 1003.238	10032	+0.122
500	240 1023.444	240 1023.309	10039	+0.135
501	240 1026.301	240 1026.177	10040	+0.124
502	240 1026.297	240 1026.177	10040	+0.120
503	240 1037.760	240 1037.646	10044	+0.114
504	240 1057.831	240 1057.717	10051	+0.114
505	240 1066.442	240 1066.319	10054	+0.123
506	240 1112.310	240 1112.196	10070	+0.114
507	240 1115.176	240 1115.063	10071	+0.113
508	240 1132.417	240 1132.267	10077	+0.150
509	240 1132.378	240 1132.267	10077	+0.111
510	240 1135.245	240 1135.134	10078	+0.111
511	240 1172.521	240 1172.409	10091	+0.112
512	240 1175.394	240 1175.277	10092	+0.117
513	240 1178.262	240 1178.144	10093	+0.118
514	240 1218.402	240 1218.286	10107	+0.116
515	240 1218.403	240 1218.286	10107	+0.117
516	240 1221.266	240 1221.154	10108	+0.112
517	240 1324.501	240 1324.377	10144	+0.124
518	240 1370.372	240 1370.254	10160	+0.118
519	240 1384.705	240 1384.591	10165	+0.114
520	240 1387.572	240 1387.458	10166	+0.114

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
521	240 1407.644	240 1407.529	10173	+0.115
522	240 1410.503	240 1410.396	10174	+0.107
523	240 1436.338	240 1436.202	10183	+0.136
524	240 1473.594	240 1473.477	10196	+0.117
525	240 1496.528	240 1496.416	10204	+0.112
526	240 1539.524	240 1539.425	10219	+0.099
527	240 1757.465	240 1757.341	10295	+0.124
528	240 1760.330	240 1760.208	10296	+0.122
529	240 1780.395	240 1780.280	10303	+0.115
530	240 1783.313	240 1783.147	10304	+0.166
531	240 1797.610	240 1797.483	10309	+0.127
532	240 1803.356	240 1803.218	10311	+0.138
533	240 1806.220	240 1806.085	10312	+0.135
534	240 2081.467	240 2081.347	10408	+0.120
535	240 2104.418	240 2104.286	10416	+0.132
536	240 2124.465	240 2124.357	10423	+0.108
537	240 2127.335	240 2127.224	10424	+0.111
538	240 2167.481	240 2167.367	10438	+0.114
539	240 2170.348	240 2170.234	10439	+0.114
540	240 2196.179	240 2196.040	10448	+0.139
541	240 2213.351	240 2213.244	10454	+0.107
542	240 2233.422	240 2233.315	10461	+0.107
543	240 2236.295	240 2236.182	10462	+0.113
544	240 2256.396	240 2256.253	10469	+0.143
545	240 2259.250	240 2259.121	10470	+0.129
546	240 2279.279	240 2279.192	10477	+0.087
547	240 2302.220	240 2302.130	10485	+0.090
548	240 2319.450	240 2319.334	10491	+0.116
549	240 2322.294	240 2322.201	10492	+0.093
550	240 2448.472	240 2448.363	10536	+0.109
551	240 2448.471	240 2448.363	10536	+0.108
552	240 2468.549	240 2468.434	10543	+0.115
553	240 2494.334	240 2494.240	10552	+0.094
554	240 2494.342	240 2494.240	10552	+0.102
555	240 2514.424	240 2514.311	10559	+0.113
556	240 2517.285	240 2517.179	10560	+0.106
557	240 2531.626	240 2531.515	10565	+0.111
558	240 2534.497	240 2534.382	10566	+0.115
559	240 2537.374	240 2537.250	10567	+0.124
560	240 2560.301	240 2560.188	10575	+0.113

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
561	240 2560.303	240 2560.188	10575	+0.115
562	240 2563.193	240 2563.056	10576	+0.137
563	240 2583.238	240 2583.127	10583	+0.111
564	240 2620.506	240 2620.402	10596	+0.104
565	240 2623.385	240 2623.269	10597	+0.116
566	240 2623.383	240 2623.269	10597	+0.114
567	240 2623.376	240 2623.269	10597	+0.107
568	240 2626.255	240 2626.136	10598	+0.119
569	240 2646.322	240 2646.208	10605	+0.114
570	240 2646.333	240 2646.208	10605	+0.125
571	240 2689.324	240 2689.217	10620	+0.107
572	240 2815.499	240 2815.379	10664	+0.120
573	240 2838.428	240 2838.317	10672	+0.111
574	240 2858.490	240 2858.389	10679	+0.101
575	240 2861.370	240 2861.256	10680	+0.114
576	240 2881.435	240 2881.327	10687	+0.108
577	240 2881.431	240 2881.327	10687	+0.104
578	240 2884.308	240 2884.194	10688	+0.114
579	240 2907.240	240 2907.133	10696	+0.107
580	240 2927.280	240 2927.204	10703	+0.076
581	240 2930.183	240 2930.071	10704	+0.112
582	240 2947.356	240 2947.275	10710	+0.081
583	240 2973.196	240 2973.081	10719	+0.115
584	240 2987.521	240 2987.418	10724	+0.103
585	240 2993.257	240 2993.152	10726	+0.105
586	240 3013.330	240 3013.223	10733	+0.107
587	240 3013.329	240 3013.223	10733	+0.106
588	240 3033.406	240 3033.295	10740	+0.111
589	240 3159.549	240 3159.456	10784	+0.093
590	240 3182.510	240 3182.395	10792	+0.115
591	240 3205.431	240 3205.333	10800	+0.098
592	240 3208.322	240 3208.201	10801	+0.121
593	240 3228.385	240 3228.272	10808	+0.113
594	240 3231.256	240 3231.139	10809	+0.117
595	240 3248.440	240 3248.343	10815	+0.097
596	240 3294.321	240 3294.220	10831	+0.101
597	240 3311.530	240 3311.424	10837	+0.106
598	240 3357.410	240 3357.301	10853	+0.109
599	240 3380.345	240 3380.239	10861	+0.106
600	240 3380.351	240 3380.239	10861	+0.112

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
601	240 3529.446	240 3529.339	10913	+0.107
602	240 3549.512	240 3549.411	10920	+0.101
603	240 3569.437	240 3569.482	10927	-0.045
604	240 3572.442	240 3572.349	10928	+0.093
605	240 3592.528	240 3592.420	10935	+0.108
606	240 3595.391	240 3595.288	10936	+0.103
607	240 3598.261	240 3598.155	10937	+0.106
608	240 3621.216	240 3621.093	10945	+0.123
609	240 3641.274	240 3641.165	10952	+0.109
610	240 3661.315	240 3661.236	10959	+0.079
611	240 3681.401	240 3681.307	10966	+0.094
612	240 3684.276	240 3684.174	10967	+0.102
613	240 3704.342	240 3704.245	10974	+0.097
614	240 3724.427	240 3724.317	10981	+0.110
615	240 3744.494	240 3744.388	10988	+0.106
616	240 3747.365	240 3747.255	10989	+0.110
617	240 3790.370	240 3790.265	11004	+0.105
618	240 3790.354	240 3790.265	11004	+0.089
619	240 3896.460	240 3896.355	11041	+0.105
620	240 3916.523	240 3916.427	11048	+0.096
621	240 3919.391	240 3919.294	11049	+0.097
622	240 3936.596	240 3936.498	11055	+0.098
623	240 3936.599	240 3936.498	11055	+0.101
624	240 3939.474	240 3939.365	11056	+0.109
625	240 3939.467	240 3939.365	11056	+0.102
626	240 3942.333	240 3942.232	11057	+0.101
627	240 3942.344	240 3942.232	11057	+0.112
628	240 3959.537	240 3959.436	11063	+0.101
629	240 3982.474	240 3982.375	11071	+0.099
630	240 3982.456	240 3982.375	11071	+0.081
631	240 3982.469	240 3982.375	11071	+0.094
632	240 3982.471	240 3982.375	11071	+0.096
633	240 3982.478	240 3982.375	11071	+0.103
634	240 4028.335	240 4028.252	11087	+0.083
635	240 4031.227	240 4031.119	11088	+0.108
636	240 4045.560	240 4045.456	11093	+0.104
637	240 4051.260	240 4051.190	11095	+0.070
638	240 4068.460	240 4068.394	11101	+0.066
639	240 4068.494	240 4068.394	11101	+0.100
640	240 4071.362	240 4071.261	11102	+0.101

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
641	240 4091.432	240 4091.333	11109	+0.099
642	240 4091.429	240 4091.333	11109	+0.096
643	240 4094.267	240 4094.200	11110	+0.067
644	240 4094.296	240 4094.200	11110	+0.096
645	240 4094.299	240 4094.200	11110	+0.099
646	240 4137.260	240 4137.209	11125	+0.051
647	240 4137.303	240 4137.209	11125	+0.094
648	240 4157.369	240 4157.281	11132	+0.088
649	240 4306.479	240 4306.381	11184	+0.098
650	240 4306.471	240 4306.381	11184	+0.090
651	240 4306.479	240 4306.381	11184	+0.098
652	240 4309.360	240 4309.248	11185	+0.112
653	240 4326.540	240 4326.452	11191	+0.088
654	240 4329.416	240 4329.319	11192	+0.097
655	240 4332.290	240 4332.187	11193	+0.103
656	240 4332.285	240 4332.187	11193	+0.098
657	240 4349.487	240 4349.391	11199	+0.096
658	240 4352.358	240 4352.258	11200	+0.100
659	240 4372.421	240 4372.329	11207	+0.092
660	240 4372.422	240 4372.329	11207	+0.093
661	240 4372.426	240 4372.329	11207	+0.097
662	240 4375.309	240 4375.196	11208	+0.113
663	240 4375.290	240 4375.196	11208	+0.094
664	240 4375.295	240 4375.196	11208	+0.099
665	240 4398.231	240 4398.135	11216	+0.096
666	240 4441.245	240 4441.145	11231	+0.100
667	240 4441.244	240 4441.145	11231	+0.099
668	240 4458.451	240 4458.348	11237	+0.103
669	240 4461.307	240 4461.216	11238	+0.091
670	240 4484.244	240 4484.154	11246	+0.090
671	240 4504.317	240 4504.225	11253	+0.092
672	240 4630.496	240 4630.387	11297	+0.109
673	240 4650.553	240 4650.458	11304	+0.095
674	240 4650.548	240 4650.458	11304	+0.090
675	240 4650.545	240 4650.458	11304	+0.087
676	240 4676.358	240 4676.264	11313	+0.094
677	240 4676.360	240 4676.264	11313	+0.096
678	240 4676.362	240 4676.264	11313	+0.098
679	240 4699.294	240 4699.203	11321	+0.091
680	240 4716.499	240 4716.406	11327	+0.093

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
681	240 4716.505	240 4716.406	11327	+0.099
682	240 4739.428	240 4739.345	11335	+0.083
683	240 4762.361	240 4762.283	11343	+0.078
684	240 4795.318	240 4796.691	11355	-0.373
685	240 4808.259	240 4808.160	11359	+0.099
686	240 4868.462	240 4868.374	11380	+0.088
687	240 4891.405	240 4891.312	11388	+0.093
688	240 4997.492	240 4997.403	11425	+0.089
689	240 5017.559	240 5017.474	11432	+0.085
690	240 5017.571	240 5017.474	11432	+0.097
691	240 5020.411	240 5020.341	11433	+0.070
692	240 5020.432	240 5020.341	11433	+0.091
693	240 5040.505	240 5040.413	11440	+0.092
694	240 5040.499	240 5040.413	11440	+0.086
695	240 5043.369	240 5043.280	11441	+0.089
696	240 5060.569	240 5060.484	11447	+0.085
697	240 5063.438	240 5063.351	11448	+0.087
698	240 5066.310	240 5066.218	11449	+0.092
699	240 5083.516	240 5083.422	11455	+0.094
700	240 5083.516	240 5083.422	11455	+0.094
701	240 5086.375	240 5086.290	11456	+0.085
702	240 5089.251	240 5089.157	11457	+0.094
703	240 5109.336	240 5109.228	11464	+0.108
704	240 5112.201	240 5112.095	11465	+0.106
705	240 5129.372	240 5129.299	11471	+0.073
706	240 5132.250	240 5132.167	11472	+0.083
707	240 5218.272	240 5218.186	11502	+0.086
708	240 5344.486	240 5344.348	11546	+0.138
709	240 5364.510	240 5364.419	11553	+0.091
710	240 5367.376	240 5367.286	11554	+0.090
711	240 5390.319	240 5390.225	11562	+0.094
712	240 5410.401	240 5410.296	11569	+0.105
713	240 5427.589	240 5427.500	11575	+0.089
714	240 5433.324	240 5433.234	11577	+0.090
715	240 5433.338	240 5433.234	11577	+0.104
716	240 5436.195	240 5436.102	11578	+0.093
717	240 5453.394	240 5453.305	11584	+0.089
718	240 5456.255	240 5456.173	11585	+0.082
719	240 5476.319	240 5476.244	11592	+0.075
720	240 5476.331	240 5476.244	11592	+0.087

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(D-C)
721	240 5496.404	240 5496.315	11599	+0.089
722	240 5519.337	240 5519.254	11607	+0.083
723	240 5522.215	240 5522.121	11608	+0.094
724	240 5539.401	240 5539.325	11614	+0.076
725	240 5539.411	240 5539.325	11614	+0.086
726	240 5559.481	240 5559.396	11621	+0.085
727	240 5562.346	240 5562.263	11622	+0.083
728	240 5565.213	240 5565.131	11623	+0.082
729	240 5582.416	240 5582.334	11629	+0.082
730	240 5628.298	240 5628.211	11645	+0.087
731	240 5754.458	240 5754.373	11689	+0.085
732	240 5777.394	240 5777.312	11697	+0.082
733	240 5800.335	240 5800.250	11705	+0.085
734	240 5820.404	240 5820.321	11712	+0.083
735	240 5949.433	240 5949.350	11757	+0.083
736	240 5952.301	240 5952.218	11758	+0.083
737	240 5952.292	240 5952.218	11758	+0.074
738	240 6101.405	240 6101.318	11810	+0.087
739	240 6121.462	240 6121.389	11817	+0.073
740	240 6124.357	240 6124.256	11818	+0.101
741	240 6138.656	240 6138.593	11823	+0.063
742	240 6141.546	240 6141.460	11824	+0.086
743	240 6144.390	240 6144.327	11825	+0.063
744	240 6144.419	240 6144.327	11825	+0.092
745	240 6144.409	240 6144.327	11825	+0.082
746	240 6164.478	240 6164.399	11832	+0.079
747	240 6167.342	240 6167.266	11833	+0.076
748	240 6190.273	240 6190.204	11841	+0.069
749	240 6213.234	240 6213.143	11849	+0.091
750	240 6213.225	240 6213.143	11849	+0.082
751	240 6230.419	240 6230.347	11855	+0.072
752	240 6256.227	240 6256.153	11864	+0.074
753	240 6256.224	240 6256.153	11864	+0.071
754	240 6273.408	240 6273.356	11870	+0.052
755	240 6299.240	240 6299.162	11879	+0.078
756	240 6319.298	240 6319.233	11886	+0.065
757	240 6465.526	240 6465.466	11937	+0.060
758	240 6488.476	240 6488.405	11945	+0.071
759	240 6488.477	240 6488.405	11945	+0.072
760	240 6508.547	240 6508.476	11952	+0.071

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
761	240 6511.406	240 6511.343	11953	+0.063
762	240 6511.419	240 6511.343	11953	+0.076
763	240 6511.418	240 6511.343	11953	+0.075
764	240 6511.402	240 6511.343	11953	+0.059
765	240 6531.490	240 6531.415	11960	+0.075
766	240 6531.487	240 6531.415	11960	+0.072
767	240 6534.343	240 6534.282	11961	+0.061
768	240 6534.358	240 6534.282	11961	+0.076
769	240 6534.358	240 6534.282	11961	+0.076
770	240 6534.358	240 6534.282	11961	+0.076
771	240 6537.227	240 6537.149	11962	+0.078
772	240 6554.394	240 6554.353	11968	+0.041
773	240 6574.490	240 6574.424	11975	+0.066
774	240 6577.365	240 6577.292	11976	+0.073
775	240 6600.269	240 6600.230	11984	+0.039
776	240 6600.282	240 6600.230	11984	+0.052
777	240 6623.239	240 6623.168	11992	+0.071
778	240 6666.240	240 6666.178	12007	+0.062
779	240 6832.554	240 6832.482	12065	+0.072
780	240 6852.585	240 6852.553	12072	+0.032
781	240 6855.483	240 6855.421	12073	+0.062
782	240 6875.544	240 6875.492	12080	+0.052
783	240 6878.422	240 6878.359	12081	+0.063
784	240 6881.305	240 6881.227	12082	+0.078
785	240 6901.335	240 6901.298	12089	+0.037
786	240 6964.403	240 6964.379	12111	+0.024
787	240 6967.299	240 6967.246	12112	+0.053
788	240 6990.241	240 6990.184	12120	+0.057
789	240 7004.562	240 7004.521	12125	+0.041
790	240 7053.315	240 7053.265	12142	+0.050
791	240 7053.304	240 7053.265	12142	+0.039
792	240 7053.308	240 7053.265	12142	+0.043
793	240 7202.433	240 7202.365	12194	+0.068
794	240 7225.364	240 7225.304	12202	+0.060
795	240 7248.298	240 7248.242	12210	+0.056
796	240 7268.353	240 7268.314	12217	+0.039
797	240 7291.287	240 7291.252	12225	+0.035
798	240 7291.296	240 7291.252	12225	+0.044
799	240 7314.243	240 7314.191	12233	+0.052
800	240 7331.449	240 7331.394	12239	+0.055

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
1001	241 3094.649	241 3094.690	14249	-0.041
1002	241 3140.536	241 3140.567	14265	-0.031
1003	241 3160.604	241 3160.639	14272	-0.035
1004	241 3166.334	241 3166.373	14274	-0.039
1005	241 3166.352	241 3166.373	14274	-0.021
1006	241 3183.539	241 3183.577	14280	-0.038
1007	241 3213.253	241 3212.250	14290	+0.003
1008	241 3398.585	241 3398.625	14355	-0.040
1009	241 3424.415	241 3424.431	14364	-0.016
1010	241 3464.529	241 3464.574	14378	-0.045
1011	241 3464.545	241 3464.574	14378	-0.029
1012	241 3467.401	241 3467.441	14379	-0.040
1013	241 3467.412	241 3467.441	14379	-0.029
1014	241 3467.416	241 3467.441	14379	-0.025
1015	241 3484.609	241 3484.645	14385	-0.036
1016	241 3484.613	241 3484.645	14385	-0.032
1017	241 3484.615	241 3484.645	14385	-0.030
1018	241 3487.474	241 3487.512	14386	-0.038
1019	241 3490.349	241 3490.379	14387	-0.030
1020	241 3493.209	241 3493.247	14388	-0.038
1021	241 3550.536	241 3550.593	14408	-0.057
1022	241 3550.558	241 3550.593	14408	-0.035
1023	241 3550.587	241 3550.593	14408	-0.006
1024	241 3570.608	241 3570.664	14415	-0.056
1025	241 3579.238	241 3579.266	14418	-0.028
1026	241 3639.456	241 3639.480	14439	-0.024
1027	241 3642.321	241 3642.347	14440	-0.026
1028	241 3788.542	241 3788.580	14491	-0.038
1029	241 3831.556	241 3831.589	14506	-0.033
1030	241 3834.426	241 3834.457	14507	-0.031
1031	241 3834.403	241 3834.457	14507	-0.054
1032	241 3851.633	241 3851.661	14513	-0.028
1033	241 3857.356	241 3857.395	14515	-0.039
1034	241 3874.548	241 3874.599	14521	-0.051
1035	241 3986.391	241 3986.424	14560	-0.033
1036	241 4198.570	241 4198.605	14634	-0.035
1037	241 4204.298	241 4204.340	14636	-0.042
1038	241 4218.651	241 4218.676	14641	-0.025
1039	241 4221.508	241 4221.544	14642	-0.036
1040	241 4224.376	241 4224.411	14643	-0.035

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
961	241 2042.372	241 2042.387	13882	-0.015
962	241 2042.364	241 2042.387	13882	-0.023
963	241 2042.359	241 2042.387	13882	-0.028
964	241 2045.225	241 2045.254	13883	-0.029
965	241 2045.254	241 2045.254	13883	+0.000
966	241 2062.431	241 2062.458	13889	-0.027
967	241 2062.432	241 2062.458	13889	-0.026
968	241 2065.301	241 2065.326	13890	-0.025
969	241 2065.305	241 2065.326	13890	-0.021
970	241 2065.296	241 2065.326	13890	-0.030
971	241 2065.299	241 2065.326	13890	-0.027
972	241 2065.310	241 2065.326	13890	-0.016
973	241 2065.300	241 2065.326	13890	-0.026
974	241 2088.228	241 2088.264	13898	-0.036
975	241 2088.269	241 2088.264	13898	+0.005
976	241 2145.581	241 2145.610	13918	-0.029
977	241 2151.320	241 2151.345	13920	-0.025
978	241 2171.382	241 2171.416	13927	-0.034
979	241 2174.259	241 2174.283	13928	-0.024
980	241 2340.553	241 2340.587	13986	-0.034
981	241 2340.552	241 2340.587	13986	-0.035
982	241 2343.419	241 2343.455	13987	-0.036
983	241 2363.508	241 2363.526	13994	-0.018
984	241 2366.351	241 2366.393	13995	-0.042
985	241 2397.923	241 2397.934	14006	-0.011
986	241 2400.783	241 2400.801	14007	-0.018
987	241 2403.674	241 2403.668	14008	+0.006
988	241 2406.513	241 2406.536	14009	-0.023
989	241 2423.751	241 2423.739	14015	+0.012
990	241 2426.596	241 2426.607	14016	-0.011
991	241 2440.939	241 2440.943	14021	-0.004
992	241 2443.797	241 2443.811	14022	-0.014
993	241 2455.260	241 2455.280	14026	-0.020
994	241 2466.704	241 2466.749	14030	-0.045
995	241 2541.288	241 2541.299	14056	-0.011
996	241 2681.758	241 2681.798	14105	-0.040
997	241 2776.370	241 2776.419	14138	-0.049
998	241 2776.402	241 2776.419	14138	-0.017
999	241 2776.390	241 2776.419	14138	-0.029
1000	241 2779.260	241 2779.286	14139	-0.026

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
921	241 0978.588	241 0978.615	13511	-0.027
922	241 0984.346	241 0984.349	13513	-0.003
923	241 1007.278	241 1007.288	13521	-0.010
924	241 1067.419	241 1067.501	13542	-0.082
925	241 1322.679	241 1322.692	13631	-0.013
926	241 1322.675	241 1322.692	13631	-0.017
927	241 1325.535	241 1325.559	13632	-0.024
928	241 1325.554	241 1325.559	13632	-0.005
929	241 1328.403	241 1328.427	13633	-0.024
930	241 1348.486	241 1348.498	13640	-0.012
931	241 1351.344	241 1351.365	13641	-0.021
932	241 1411.559	241 1411.579	13662	-0.020
933	241 1411.581	241 1411.579	13662	+0.002
934	241 1417.301	241 1417.313	13664	-0.012
935	241 1563.524	241 1563.546	13715	-0.022
936	241 1563.535	241 1563.546	13715	-0.011
937	241 1649.544	241 1649.565	13745	-0.021
938	241 1652.408	241 1652.433	13746	-0.025
939	241 1655.242	241 1655.300	13747	-0.058
940	241 1655.282	241 1655.300	13747	-0.018
941	241 1692.571	241 1692.575	13760	-0.004
942	241 1715.488	241 1715.514	13768	-0.026
943	241 1718.342	241 1718.381	13769	-0.039
944	241 1718.354	241 1718.381	13769	-0.027
945	241 1718.354	241 1718.381	13769	-0.027
946	241 1778.547	241 1778.594	13790	-0.047
947	241 1804.367	241 1804.400	13799	-0.033
948	241 1827.308	241 1827.339	13807	-0.031
949	241 1976.404	241 1976.439	13859	-0.035
950	241 1996.473	241 1996.510	13866	-0.037
951	241 1999.358	241 1999.377	13867	-0.019
952	241 1999.346	241 1999.377	13867	-0.031
953	241 2019.428	241 2019.449	13874	-0.021
954	241 2022.283	241 2022.316	13875	-0.033
955	241 2022.291	241 2022.316	13875	-0.025
956	241 2039.494	241 2039.520	13881	-0.026
957	241 2039.504	241 2039.520	13881	-0.016
958	241 2042.358	241 2042.387	13882	-0.029
959	241 2042.344	241 2042.387	13882	-0.043
960	241 2042.358	241 2042.387	13882	-0.029

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
881	240 9103.399	240 9103.393	12857	+0.006
882	240 9106.275	240 9106.260	12858	+0.015
883	240 9126.345	240 9126.331	12865	+0.014
884	240 9143.510	240 9143.535	12871	-0.025
885	240 9149.284	240 9149.270	12873	+0.014
886	240 9152.181	240 9152.137	12874	+0.044
887	240 9166.525	240 9166.474	12879	+0.051
888	240 9209.481	240 9209.483	12894	-0.002
889	240 9212.370	240 9212.351	12895	+0.019
890	240 9235.304	240 9235.289	12903	+0.015
891	240 9252.518	240 9252.493	12909	+0.025
892	240 9295.522	240 9295.503	12924	+0.019
893	240 9447.479	240 9447.470	12977	+0.009
894	240 9473.286	240 9473.276	12986	+0.010
895	240 9490.522	240 9490.480	12992	+0.042
896	240 9493.361	240 9493.347	12993	+0.014
897	240 9510.574	240 9510.551	12999	+0.023
898	240 9625.257	240 9625.244	13039	+0.013
899	240 9791.543	240 9791.548	13097	-0.005
900	240 9886.169	240 9886.169	13130	+0.000
901	240 9900.508	240 9900.505	13135	+0.003
902	241 0184.366	241 0184.369	13234	-0.003
903	241 0184.378	241 0184.369	13234	+0.009
904	241 0204.454	241 0204.440	13241	+0.014
905	241 0244.582	241 0244.583	13255	-0.001
906	241 0316.272	241 0316.266	13280	+0.006
907	241 0531.312	241 0531.314	13355	-0.002
908	241 0531.324	241 0531.314	13355	+0.010
909	241 0571.452	241 0571.456	13369	-0.004
910	241 0571.455	241 0571.456	13369	-0.001
911	241 0588.645	241 0588.660	13375	-0.015
912	241 0588.643	241 0588.660	13375	-0.017
913	241 0611.576	241 0611.599	13383	-0.023
914	241 0611.584	241 0611.599	13383	-0.015
915	241 0611.583	241 0611.599	13383	-0.016
916	241 0677.531	241 0677.547	13406	-0.016
917	241 0895.453	241 0895.462	13482	-0.009
918	241 0898.335	241 0898.330	13483	+0.005
919	241 0918.392	241 0918.401	13490	-0.009
920	241 0938.460	241 0938.472	13497	-0.012

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
841	240 8082.663	240 8082.630	12501	+0.033
842	240 8088.404	240 8088.365	12503	+0.039
843	240 8091.274	240 8091.232	12504	+0.042
844	240 8091.284	240 8091.232	12504	+0.052
845	240 8108.481	240 8108.436	12510	+0.045
846	240 8114.215	240 8114.170	12512	+0.045
847	240 8154.366	240 8154.313	12526	+0.053
848	240 8154.353	240 8154.313	12526	+0.040
849	240 8280.508	240 8280.474	12570	+0.034
850	240 8300.579	240 8300.546	12577	+0.033
851	240 8303.452	240 8303.413	12578	+0.039
852	240 8346.457	240 8346.423	12593	+0.034
853	240 8369.369	240 8369.361	12601	+0.008
854	240 8389.453	240 8389.432	12608	+0.021
855	240 8392.319	240 8392.300	12609	+0.019
856	240 8409.531	240 8409.504	12615	+0.027
857	240 8412.404	240 8412.371	12616	+0.033
858	240 8458.270	240 8458.248	12632	+0.022
859	240 8481.218	240 8481.186	12640	+0.032
860	240 8495.551	240 8495.523	12645	+0.028
861	240 8498.415	240 8498.390	12646	+0.025
862	240 8521.355	240 8521.329	12654	+0.026
863	240 8521.353	240 8521.329	12654	+0.024
864	240 8521.361	240 8521.329	12654	+0.032
865	240 8524.238	240 8524.196	12655	+0.042
866	240 8544.292	240 8544.267	12662	+0.025
867	240 8670.459	240 8670.429	12706	+0.030
868	240 8690.536	240 8690.500	12713	+0.036
869	240 8739.242	240 8739.244	12730	-0.002
870	240 8779.419	240 8779.387	12744	+0.032
871	240 8782.277	240 8782.254	12745	+0.023
872	240 8822.425	240 8822.396	12759	+0.029
873	240 8825.288	240 8825.264	12760	+0.024
874	240 8848.223	240 8848.202	12768	+0.021
875	240 9014.540	240 9014.506	12826	+0.034
876	240 9034.581	240 9034.577	12833	+0.004
877	240 9037.460	240 9037.445	12834	+0.015
878	240 9057.463	240 9057.516	12841	-0.053
879	240 9060.410	240 9060.383	12842	+0.027
880	240 9083.341	240 9083.322	12850	+0.019

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
801	240 7334.296	240 7334.262	12240	+0.034
802	240 7357.242	240 7357.200	12248	+0.042
803	240 7377.326	240 7377.271	12255	+0.055
804	240 7380.202	240 7380.139	12256	+0.063
805	240 7400.282	240 7400.210	12263	+0.072
806	240 7420.345	240 7420.281	12270	+0.064
807	240 7466.506	240 7466.158	12286	+0.348
808	240 7569.428	240 7569.381	12322	+0.047
809	240 7592.367	240 7592.320	12330	+0.047
810	240 7612.440	240 7612.391	12337	+0.049
811	240 7632.499	240 7632.462	12344	+0.037
812	240 7638.249	240 7638.197	12346	+0.052
813	240 7701.308	240 7701.278	12368	+0.030
814	240 7701.318	240 7701.278	12368	+0.040
815	240 7701.324	240 7701.278	12368	+0.046
816	240 7721.388	240 7721.349	12375	+0.039
817	240 7724.262	240 7724.216	12376	+0.046
818	240 7744.331	240 7744.287	12383	+0.044
819	240 7744.331	240 7744.287	12383	+0.044
820	240 7744.315	240 7744.287	12383	+0.028
821	240 7787.333	240 7787.297	12398	+0.036
822	240 7787.335	240 7787.297	12398	+0.038
823	240 7913.498	240 7913.459	12442	+0.039
824	240 7956.504	240 7956.468	12457	+0.036
825	240 7956.504	240 7956.468	12457	+0.036
826	240 7956.512	240 7956.468	12457	+0.044
827	240 7959.382	240 7959.336	12458	+0.046
828	240 7959.392	240 7959.336	12458	+0.056
829	240 7979.445	240 7979.407	12465	+0.038
830	240 7979.456	240 7979.407	12465	+0.049
831	240 7982.321	240 7982.274	12466	+0.047
832	240 7996.657	240 7996.611	12471	+0.046
833	240 7999.518	240 7999.478	12472	+0.040
834	240 8002.410	240 8002.345	12473	+0.065
835	240 8022.464	240 8022.416	12480	+0.048
836	240 8025.328	240 8025.284	12481	+0.044
837	240 8028.220	240 8028.151	12482	+0.069
838	240 8039.590	240 8039.620	12486	-0.030
839	240 8042.521	240 8042.488	12487	+0.033
840	240 8071.206	240 8071.161	12497	+0.045

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
1041	241 4224.376	241 4224.411	14643	-0.035
1042	241 4224.381	241 4224.411	14643	-0.030
1043	241 4227.240	241 4227.278	14644	-0.038
1044	241 4227.244	241 4227.278	14644	-0.034
1045	241 4244.451	241 4244.482	14650	-0.031
1046	241 4247.300	241 4247.350	14651	-0.050
1047	241 4247.309	241 4247.350	14651	-0.041
1048	241 4261.640	241 4261.686	14656	-0.046
1049	241 4270.247	241 4270.288	14659	-0.041
1050	241 4284.606	241 4284.625	14664	-0.019
1051	241 4290.307	241 4290.359	14666	-0.052
1052	241 4313.242	241 4313.298	14674	-0.056
1053	241 4333.313	241 4333.369	14681	-0.056
1054	241 4376.326	241 4376.379	14696	-0.053
1055	241 4548.376	241 4548.417	14756	-0.041
1056	241 4548.369	241 4548.417	14756	-0.048
1057	241 4608.588	241 4608.631	14777	-0.043
1058	241 4611.465	241 4611.498	14778	-0.033
1059	241 4634.398	241 4634.437	14786	-0.039
1060	241 4651.606	241 4651.640	14792	-0.034
1061	241 4720.401	241 4720.456	14816	-0.055
1062	241 4872.374	241 4872.423	14869	-0.049
1063	241 4935.479	241 4935.504	14891	-0.025
1064	241 4938.342	241 4938.372	14892	-0.030
1065	241 4938.326	241 4938.372	14892	-0.046
1066	241 4955.528	241 4955.575	14898	-0.047
1067	241 4961.270	241 4961.310	14900	-0.040
1068	241 4981.342	241 4981.381	14907	-0.039
1069	241 5007.154	241 5007.187	14916	-0.033
1070	241 5047.255	241 5047.329	14930	-0.074
1071	241 5067.349	241 5067.401	14937	-0.052
1072	241 5213.593	241 5213.633	14988	-0.040
1073	241 5282.402	241 5282.449	15012	-0.047
1074	241 5282.402	241 5282.449	15012	-0.047
1075	241 5282.406	241 5282.449	15012	-0.043
1076	241 5302.469	241 5302.520	15019	-0.051
1077	241 5305.332	241 5305.387	15020	-0.055
1078	241 5348.342	241 5348.397	15035	-0.055
1079	241 5374.224	241 5374.203	15044	+0.021
1080	241 5391.369	241 5391.407	15050	-0.038

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
1081	241 5394.235	241 5394.274	15051	-0.039
1082	241 5428.630	241 5428.682	15063	-0.052
1083	241 5431.422	241 5431.549	15064	-0.127
1084	241 5434.365	241 5434.416	15065	-0.051
1085	241 5434.371	241 5434.416	15065	-0.045
1086	241 5451.575	241 5451.620	15071	-0.045
1087	241 5454.425	241 5454.488	15072	-0.063
1088	241 5457.332	241 5457.355	15073	-0.023
1089	241 5606.402	241 5606.455	15125	-0.053
1090	241 5606.403	241 5606.455	15125	-0.052
1091	241 5649.418	241 5649.465	15140	-0.047
1092	241 5666.624	241 5666.669	15146	-0.045
1093	241 5666.633	241 5666.669	15146	-0.036
1094	241 5669.485	241 5669.536	15147	-0.051
1095	241 5692.404	241 5692.474	15155	-0.070
1096	241 5695.290	241 5695.342	15156	-0.052
1097	241 5709.640	241 5709.678	15161	-0.038
1098	241 5715.374	241 5715.413	15163	-0.039
1099	241 5715.381	241 5715.413	15163	-0.032
1100	241 5718.226	241 5718.280	15164	-0.054
1101	241 5755.521	241 5755.555	15177	-0.034
1102	241 5758.372	241 5758.423	15178	-0.051
1103	241 5761.241	241 5761.290	15179	-0.049
1104	241 5761.240	241 5761.290	15179	-0.050
1105	241 5775.609	241 5775.627	15184	-0.018
1106	241 5778.458	241 5778.494	15185	-0.036
1107	241 5781.306	241 5781.361	15186	-0.055
1108	241 5795.644	241 5795.698	15191	-0.054
1109	241 5801.381	241 5801.432	15193	-0.051
1110	241 5821.465	241 5821.504	15200	-0.039
1111	241 5824.324	241 5824.371	15201	-0.047
1112	241 5973.415	241 5973.471	15253	-0.056
1113	241 5990.605	241 5990.675	15259	-0.070
1114	241 6016.439	241 6016.481	15268	-0.042
1115	241 6016.439	241 6016.481	15268	-0.042
1116	241 6019.315	241 6019.348	15269	-0.033
1117	241 6039.382	241 6039.419	15276	-0.037
1118	241 6056.598	241 6056.623	15282	-0.025
1119	241 6082.367	241 6082.429	15291	-0.062
1120	241 6085.269	241 6085.296	15292	-0.027

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
1121	241 6099.575	241 6099.633	15297	-0.058
1122	241 6108.181	241 6108.235	15300	-0.054
1123	241 6191.358	241 6191.387	15329	-0.029
1124	241 6337.555	241 6337.620	15380	-0.065
1125	241 6340.442	241 6340.487	15381	-0.045
1126	241 6360.483	241 6360.558	15388	-0.075
1127	241 6363.393	241 6363.425	15389	-0.032
1128	241 6380.480	241 6380.629	15395	-0.149
1129	241 6383.458	241 6383.497	15396	-0.039
1130	241 6386.333	241 6386.364	15397	-0.031
1131	241 6406.366	241 6406.435	15404	-0.069
1132	241 6426.451	241 6426.506	15411	-0.055
1133	241 6558.352	241 6558.403	15457	-0.051
1134	241 6704.575	241 6704.635	15508	-0.060
1135	241 6750.455	241 6750.512	15524	-0.057
1136	241 6799.249	241 6799.257	15541	-0.008
1137	241 6799.203	241 6799.257	15541	-0.054
1138	241 6836.490	241 6836.532	15554	-0.042
1139	241 6842.229	241 6842.266	15556	-0.037
1140	241 6842.224	241 6842.266	15556	-0.042
1141	241 6842.226	241 6842.266	15556	-0.040
1142	241 6902.414	241 6902.480	15577	-0.066
1143	241 6928.241	241 6928.286	15586	-0.045
1144	241 6928.328	241 6928.286	15586	+0.042
1145	241 7054.393	241 7054.447	15630	-0.054
1146	241 7071.602	241 7071.651	15636	-0.049
1147	241 7094.538	241 7094.590	15644	-0.052
1148	241 7097.421	241 7097.457	15645	-0.036
1149	241 7117.474	241 7117.528	15652	-0.054
1150	241 7140.424	241 7140.467	15660	-0.043
1151	241 7160.487	241 7160.538	15667	-0.051
1152	241 7166.234	241 7166.273	15669	-0.039
1153	241 7186.287	241 7186.344	15676	-0.057
1154	241 7186.304	241 7186.344	15676	-0.040
1155	241 7206.354	241 7206.415	15683	-0.061
1156	241 7249.370	241 7249.425	15698	-0.055
1157	241 7249.373	241 7249.425	15698	-0.052
1158	241 7272.311	241 7272.363	15706	-0.052
1159	241 7292.387	241 7292.434	15713	-0.047
1160	241 7438.629	241 7438.667	15764	-0.038

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
1161	241 7441.476	241 7441.534	15765	-0.058
1162	241 7467.304	241 7467.340	15774	-0.036
1163	241 7507.435	241 7507.483	15788	-0.048
1164	241 7507.435	241 7507.483	15788	-0.048
1165	241 7593.482	241 7593.502	15818	-0.020
1166	241 7593.459	241 7593.502	15818	-0.043
1167	241 7599.195	241 7599.237	15820	-0.042
1168	241 7639.356	241 7639.379	15834	-0.023
1169	241 7639.329	241 7639.379	15834	-0.050
1170	241 7639.338	241 7639.379	15834	-0.041
1171	241 7639.317	241 7639.379	15834	-0.062
1172	241 7659.397	241 7659.450	15841	-0.053
1173	241 7828.562	241 7828.621	15900	-0.059
1174	241 7831.453	241 7831.489	15901	-0.036
1175	241 7831.440	241 7831.489	15901	-0.049
1176	241 7834.305	241 7834.356	15902	-0.051
1177	241 7854.367	241 7854.427	15909	-0.060
1178	241 7854.356	241 7854.427	15909	-0.071
1179	241 7871.594	241 7871.631	15915	-0.037
1180	241 7874.442	241 7874.498	15916	-0.056
1181	241 7877.318	241 7877.366	15917	-0.048
1182	241 7920.315	241 7920.375	15932	-0.060
1183	241 7920.318	241 7920.375	15932	-0.057
1184	241 7940.398	241 7940.447	15939	-0.049
1185	241 7943.254	241 7943.314	15940	-0.060
1186	241 7943.273	241 7943.314	15940	-0.041
1187	241 7960.459	241 7960.518	15946	-0.059
1188	241 8026.401	241 8026.466	15969	-0.065
1189	241 8152.558	241 8152.628	16013	-0.070
1190	241 8152.568	241 8152.628	16013	-0.060
1191	241 8178.401	241 8178.433	16022	-0.032
1192	241 8192.710	241 8192.770	16027	-0.060
1193	241 8195.598	241 8195.637	16028	-0.039
1194	241 8215.646	241 8215.709	16035	-0.063
1195	241 8218.509	241 8218.576	16036	-0.067
1196	241 8221.386	241 8221.443	16037	-0.057
1197	241 8221.396	241 8221.443	16037	-0.047
1198	241 8224.261	241 8224.310	16038	-0.049
1199	241 8244.327	241 8244.382	16045	-0.055
1200	241 8244.336	241 8244.382	16045	-0.046

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
1201	241 8244.329	241 8244.382	16045	-0.053
1202	241 8261.540	241 8261.586	16051	-0.046
1203	241 8264.396	241 8264.453	16052	-0.057
1204	241 8267.322	241 8267.320	16053	+0.002
1205	241 8290.244	241 8290.259	16061	-0.015
1206	241 8330.350	241 8330.401	16075	-0.051
1207	241 8330.368	241 8330.401	16075	-0.033
1208	241 8333.233	241 8333.268	16076	-0.035
1209	241 8373.349	241 8373.411	16090	-0.062
1210	241 8591.262	241 8591.326	16166	-0.064
1211	241 8602.732	241 8602.796	16170	-0.064
1212	241 8631.426	241 8631.469	16180	-0.043
1213	241 8651.473	241 8651.540	16187	-0.067
1214	241 8657.212	241 8657.274	16189	-0.062
1215	241 8671.545	241 8671.611	16194	-0.066
1216	241 8674.411	241 8674.478	16195	-0.067
1217	241 8700.225	241 8700.284	16204	-0.059
1218	241 8717.439	241 8717.488	16210	-0.049
1219	241 8740.345	241 8740.427	16218	-0.082
1220	241 8763.292	241 8763.365	16226	-0.073
1221	241 8952.547	241 8952.608	16292	-0.061
1222	241 8955.461	241 8955.475	16293	-0.014
1223	241 9061.523	241 9061.565	16330	-0.042
1224	241 9067.240	241 9067.300	16332	-0.060
1225	241 9259.354	241 9259.410	16399	-0.056
1226	241 9302.355	241 9302.420	16414	-0.065
1227	241 9322.432	241 9322.491	16421	-0.059
1228	241 9325.290	241 9325.358	16422	-0.068
1229	241 9342.497	241 9342.562	16428	-0.065
1230	241 9368.315	241 9368.368	16437	-0.053
1231	241 9454.330	241 9454.387	16467	-0.057
1232	241 9474.385	241 9474.458	16474	-0.073
1233	241 9474.399	241 9474.458	16474	-0.059
1234	241 9666.514	241 9666.568	16541	-0.054
1235	241 9775.455	241 9775.526	16579	-0.071
1236	241 9778.322	241 9778.393	16580	-0.071
1237	241 9798.399	241 9798.464	16587	-0.065
1238	241 9821.339	241 9821.403	16595	-0.064
1239	241 9970.415	241 9970.503	16647	-0.088
1240	242 0010.563	242 0010.645	16661	-0.082

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
1241	242 0036.375	242 0036.451	16670	-0.076
1242	242 0036.369	242 0036.451	16670	-0.082
1243	242 0036.385	242 0036.451	16670	-0.066
1244	242 0039.241	242 0039.319	16671	-0.078
1245	242 0039.249	242 0039.319	16671	-0.070
1246	242 0059.316	242 0059.390	16678	-0.074
1247	242 0059.299	242 0059.390	16678	-0.091
1248	242 0079.391	242 0079.461	16685	-0.070
1249	242 0079.378	242 0079.461	16685	-0.083
1250	242 0122.385	242 0122.471	16700	-0.086
1251	242 0122.386	242 0122.471	16700	-0.085
1252	242 0125.294	242 0125.338	16701	-0.044
1253	242 0168.264	242 0168.348	16716	-0.084
1254	242 0185.440	242 0185.551	16722	-0.111
1255	242 0489.399	242 0489.486	16828	-0.087
1256	242 0492.261	242 0492.354	16829	-0.093
1257	242 0578.274	242 0578.373	16859	-0.099
1258	242 0724.429	242 0724.606	16910	-0.177
1259	242 0750.319	242 0750.412	16919	-0.093
1260	242 0770.377	242 0770.483	16926	-0.106
1261	242 0773.265	242 0773.350	16927	-0.085
1262	242 0793.322	242 0793.422	16934	-0.100
1263	242 0796.201	242 0796.289	16935	-0.088
1264	242 0819.115	242 0819.227	16943	-0.112
1265	242 0859.265	242 0859.370	16957	-0.105
1266	242 0862.132	242 0862.237	16958	-0.105
1267	242 0965.367	242 0965.460	16994	-0.093
1268	242 0965.359	242 0965.460	16994	-0.101
1269	242 1137.379	242 1137.499	17054	-0.120
1270	242 1137.388	242 1137.499	17054	-0.111
1271	242 1140.284	242 1140.366	17055	-0.082
1272	242 1157.473	242 1157.570	17061	-0.097
1273	242 1177.549	242 1177.641	17068	-0.092
1274	242 1220.530	242 1220.651	17083	-0.121
1275	242 1289.358	242 1289.466	17107	-0.108
1276	242 1312.311	242 1312.405	17115	-0.094
1277	242 1331.385	242 1332.476	17122	-0.091
1278	242 1461.376	242 1461.505	17167	-0.129
1279	242 1487.201	242 1487.311	17176	-0.110
1280	242 1487.209	242 1487.311	17176	-0.102

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
1281	242 1573.241	242 1573.330	17206	-0.089
1282	242 2023.369	242 2023.498	17363	-0.129
1283	242 2255.638	242 2255.750	17444	-0.112
1284	242 2321.595	242 2321.698	17467	-0.103
1285	242 2608.333	242 2608.430	17567	-0.097
1286	242 2619.787	242 2619.899	17571	-0.112
1287	242 2628.391	242 2628.501	17574	-0.110
1288	242 2628.405	242 2628.501	17574	-0.096
1289	242 2697.231	242 2697.316	17598	-0.085
1290	242 2972.468	242 2972.578	17694	-0.110
1291	242 2972.455	242 2972.578	17694	-0.123
1292	242 2986.808	242 2986.915	17699	-0.107
1293	242 3021.206	242 3021.322	17711	-0.116
1294	242 3047.022	242 3047.128	17720	-0.106
1295	242 3049.889	242 3049.996	17721	-0.107
1296	242 3061.365	242 3061.465	17725	-0.100
1297	242 3112.964	242 3113.076	17743	-0.112
1298	242 3147.375	242 3147.484	17755	-0.109
1299	242 3310.819	242 3310.921	17812	-0.102
1300	242 3342.357	242 3342.461	17823	-0.104
1301	242 3382.497	242 3382.604	17837	-0.107
1302	242 3385.363	242 3385.471	17838	-0.108
1303	242 3388.217	242 3388.338	17839	-0.121
1304	242 3471.374	242 3471.490	17868	-0.116
1305	242 3700.764	242 3700.875	17948	-0.111
1306	242 3715.102	242 3715.212	17953	-0.110
1307	242 3732.309	242 3732.416	17959	-0.107
1308	242 3769.577	242 3769.691	17972	-0.114
1309	242 3812.580	242 3812.700	17987	-0.120
1310	242 3864.190	242 3864.312	18005	-0.122
1311	242 4099.298	242 4099.432	18087	-0.134
1312	242 4099.322	242 4099.432	18087	-0.110
1313	242 4136.567	242 4136.707	18100	-0.140
1314	242 4139.462	242 4139.574	18101	-0.112
1315	242 4142.323	242 4142.441	18102	-0.118
1316	242 4142.317	242 4142.441	18102	-0.124
1317	242 4159.519	242 4159.645	18108	-0.126
1318	242 4162.396	242 4162.512	18109	-0.116
1319	242 4165.262	242 4165.380	18110	-0.118
1320	242 4208.274	242 4208.389	18125	-0.115

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
1321	242 4231.224	242 4231.328	18133	-0.104
1322	242 4400.388	242 4400.499	18192	-0.111
1323	242 4423.328	242 4423.438	18200	-0.110
1324	242 4440.537	242 4440.642	18206	-0.105
1325	242 4446.278	242 4446.376	18208	-0.098
1326	242 4466.340	242 4466.447	18215	-0.107
1327	242 4477.807	242 4477.917	18219	-0.110
1328	242 4489.288	242 4489.386	18223	-0.098
1329	242 4497.894	242 4497.988	18226	-0.094
1330	242 4526.550	242 4526.661	18236	-0.111
1331	242 4529.436	242 4529.528	18237	-0.092
1332	242 4575.314	242 4575.405	18253	-0.091
1333	242 4598.235	242 4598.344	18261	-0.109
1334	242 4618.309	242 4618.415	18268	-0.106
1335	242 4787.469	242 4787.586	18327	-0.117
1336	242 4807.552	242 4807.657	18334	-0.105
1337	242 4827.620	242 4827.729	18341	-0.109
1338	242 4830.483	242 4830.596	18342	-0.113
1339	242 4836.229	242 4836.331	18344	-0.102
1340	242 4847.688	242 4847.800	18348	-0.112
1341	242 4856.302	242 4856.402	18351	-0.100
1342	242 4862.022	242 4862.136	18353	-0.114
1343	242 4873.498	242 4873.606	18357	-0.108
1344	242 4876.350	242 4876.473	18358	-0.123
1345	242 4879.210	242 4879.340	18359	-0.130
1346	242 4922.267	242 4922.350	18374	-0.083
1347	242 5131.574	242 5131.664	18447	-0.090
1348	242 5134.450	242 5134.531	18448	-0.081
1349	242 5151.632	242 5151.735	18454	-0.103
1350	242 5157.370	242 5157.469	18456	-0.099
1351	242 5163.099	242 5163.204	18458	-0.105
1352	242 5180.304	242 5180.408	18464	-0.104
1353	242 5203.222	242 5203.346	18472	-0.124
1354	242 5208.973	242 5209.081	18474	-0.108
1355	242 5231.911	242 5232.020	18482	-0.109
1356	242 5243.385	242 5243.489	18486	-0.104
1357	242 5243.386	242 5243.489	18486	-0.103
1358	242 5246.256	242 5246.356	18487	-0.100
1359	242 5283.524	242 5283.631	18500	-0.107
1360	242 5294.984	242 5295.100	18504	-0.116

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
1361	242 5303.592	242 5303.702	18507	-0.110
1362	242 5309.328	242 5309.437	18509	-0.109
1363	242 5309.330	242 5309.437	18509	-0.107
1364	242 5498.566	242 5498.680	18575	-0.114
1365	242 5498.584	242 5498.680	18575	-0.096
1366	242 5501.419	242 5501.547	18576	-0.128
1367	242 5501.440	242 5501.547	18576	-0.107
1368	242 5504.310	242 5504.414	18577	-0.104
1369	242 5524.367	242 5524.485	18584	-0.118
1370	242 5524.383	242 5524.485	18584	-0.102
1371	242 5527.247	242 5527.353	18585	-0.106
1372	242 5527.263	242 5527.353	18585	-0.090
1373	242 5530.115	242 5530.220	18586	-0.105
1374	242 5530.117	242 5530.220	18586	-0.103
1375	242 5530.112	242 5530.220	18586	-0.108
1376	242 5532.980	242 5533.087	18587	-0.107
1377	242 5541.568	242 5541.689	18590	-0.121
1378	242 5541.585	242 5541.689	18590	-0.104
1379	242 5541.558	242 5541.689	18590	-0.131
1380	242 5541.583	242 5541.689	18590	-0.106
1381	242 5541.585	242 5541.689	18590	-0.104
1382	242 5544.450	242 5544.557	18591	-0.107
1383	242 5555.923	242 5556.026	18595	-0.103
1384	242 5589.858	242 5590.433	18607	-0.575
1385	242 5590.331	242 5590.433	18607	-0.102
1386	242 5598.930	242 5599.035	18610	-0.105
1387	242 5607.525	242 5607.637	18613	-0.112
1388	242 5610.415	242 5610.505	18614	-0.090
1389	242 5613.289	242 5613.372	18615	-0.083
1390	242 5641.939	242 5642.045	18625	-0.106
1391	242 5650.540	242 5650.647	18628	-0.107
1392	242 5662.012	242 5662.116	18632	-0.104
1393	242 5699.303	242 5699.391	18645	-0.088
1394	242 5699.293	242 5699.391	18645	-0.098
1395	242 5891.400	242 5891.501	18712	-0.101
1396	242 5891.408	242 5891.501	18712	-0.093
1397	242 5898.072	242 5897.236	18714	+0.836
1398	242 5917.204	242 5917.307	18721	-0.103
1399	242 5920.079	242 5920.174	18722	-0.095
1400	242 5937.285	242 5937.378	18728	-0.093

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
1401	242 5943.027	242 5943.113	18730	-0.086
1402	242 5957.359	242 5957.449	18735	-0.090
1403	242 5986.022	242 5986.122	18745	-0.100
1404	242 6000.371	242 6000.459	18750	-0.088
1405	242 6000.351	242 6000.459	18750	-0.108
1406	242 6006.089	242 6006.194	18752	-0.105
1407	242 6020.420	242 6020.530	18757	-0.110
1408	242 6029.021	242 6029.132	18760	-0.111
1409	242 6043.374	242 6043.469	18765	-0.095
1410	242 6215.407	242 6215.507	18825	-0.100
1411	242 6241.218	242 6241.313	18834	-0.095
1412	242 6264.152	242 6264.252	18842	-0.100
1413	242 6267.007	242 6267.119	18843	-0.112
1414	242 6267.008	242 6267.119	18843	-0.111
1415	242 6272.751	242 6272.854	18845	-0.103
1416	242 6310.023	242 6310.129	18858	-0.106
1417	242 6310.028	242 6310.129	18858	-0.101
1418	242 6312.895	242 6312.996	18859	-0.101
1419	242 6332.966	242 6333.067	18866	-0.101
1420	242 6347.316	242 6347.404	18871	-0.088
1421	242 6350.279	242 6350.271	18872	+0.008
1422	242 6353.038	242 6353.138	18873	-0.100
1423	242 6413.259	242 6413.352	18894	-0.093
1424	242 6556.618	242 6556.717	18944	-0.099
1425	242 6599.642	242 6599.727	18959	-0.085
1426	242 6631.165	242 6631.268	18970	-0.103
1427	242 6648.381	242 6648.471	18976	-0.090
1428	242 6651.238	242 6651.339	18977	-0.101
1429	242 6656.953	242 6657.073	18979	-0.120
1430	242 6674.175	242 6674.277	18985	-0.102
1431	242 6677.050	242 6677.145	18986	-0.095
1432	242 6742.988	242 6743.093	19009	-0.105
1433	242 6742.978	242 6743.093	19009	-0.115
1434	242 6946.571	242 6946.672	19080	-0.101
1435	242 7021.130	242 7021.222	19106	-0.092
1436	242 7023.988	242 7024.089	19107	-0.101
1437	242 7107.145	242 7107.241	19136	-0.096
1438	242 7144.404	242 7144.516	19149	-0.112
1439	242 7190.295	242 7190.393	19165	-0.098
1440	242 7253.292	242 7253.474	19187	-0.182

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
1441	242 7313.589	242 7313.688	19208	-0.099
1442	242 7313.590	242 7313.688	19208	-0.098
1443	242 7339.390	242 7339.493	19217	-0.103
1444	242 7365.215	242 7365.299	19226	-0.084
1445	242 7385.267	242 7385.370	19233	-0.103
1446	242 7405.339	242 7405.442	19240	-0.103
1447	242 7425.406	242 7425.513	19247	-0.107
1448	242 7474.155	242 7474.257	19264	-0.102
1449	242 7488.504	242 7488.594	19269	-0.090
1450	242 7491.370	242 7491.461	19270	-0.091
1451	242 7663.395	242 7663.500	19330	-0.105
1452	242 7700.686	242 7700.775	19343	-0.089
1453	242 7709.286	242 7709.377	19346	-0.091
1454	242 7729.350	242 7729.448	19353	-0.098
1455	242 7732.214	242 7732.315	19354	-0.101
1456	242 7735.096	242 7735.182	19355	-0.086
1457	242 7737.966	242 7738.050	19356	-0.084
1458	242 7737.966	242 7738.050	19356	-0.084
1459	242 7749.412	242 7749.519	19360	-0.107
1460	242 7749.414	242 7749.519	19360	-0.105
1461	242 7755.156	242 7755.254	19362	-0.098
1462	242 7758.035	242 7758.121	19363	-0.086
1463	242 7769.493	242 7769.590	19367	-0.097
1464	242 7775.238	242 7775.325	19369	-0.087
1465	242 7780.965	242 7781.059	19371	-0.094
1466	242 7801.031	242 7801.131	19378	-0.100
1467	242 7818.247	242 7818.334	19384	-0.087
1468	242 7866.981	242 7867.079	19401	-0.098
1469	242 7878.451	242 7878.548	19405	-0.097
1470	242 7881.322	242 7881.415	19406	-0.093
1471	242 7884.190	242 7884.283	19407	-0.093
1472	242 7984.542	242 7984.639	19442	-0.097
1473	242 8073.420	242 8073.525	19473	-0.105
1474	242 8073.412	242 8073.525	19473	-0.113
1475	242 8076.285	242 8076.392	19474	-0.107
1476	242 8076.296	242 8076.392	19474	-0.096
1477	242 8090.625	242 8090.729	19479	-0.104
1478	242 8093.483	242 8093.596	19480	-0.113
1479	242 8099.224	242 8099.331	19482	-0.107
1480	242 8104.964	242 8105.066	19484	-0.102

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
1481	242 8113.569	242 8113.668	19487	-0.099
1482	242 8119.297	242 8119.402	19489	-0.105
1483	242 8127.901	242 8128.004	19492	-0.103
1484	242 8127.903	242 8128.004	19492	-0.101
1485	242 8168.027	242 8168.146	19506	-0.119
1486	242 8168.042	242 8168.146	19506	-0.104
1487	242 8168.022	242 8168.146	19506	-0.124
1488	242 8168.042	242 8168.146	19506	-0.104
1489	242 8188.108	242 8188.218	19513	-0.110
1490	242 8190.992	242 8191.085	19514	-0.093
1491	242 8190.980	242 8191.085	19514	-0.105
1492	242 8213.935	242 8214.023	19522	-0.088
1493	242 8434.711	242 8434.806	19599	-0.095
1494	242 8483.456	242 8483.551	19616	-0.095
1495	242 8821.792	242 8821.893	19734	-0.101
1496	242 9131.464	242 9131.563	19842	-0.099
1497	242 9163.495	242 9163.104	19853	+0.391
1498	242 9194.545	242 9194.644	19864	-0.099
1499	242 9209.354	242 9208.981	19869	+0.373
1500	242 9234.686	242 9234.786	19878	-0.100
1501	242 9552.955	242 9553.058	19989	-0.103
1502	242 9931.456	242 9931.543	20121	-0.087
1503	243 0315.648	243 0315.763	20255	-0.115
1504	243 0318.528	243 0318.630	20256	-0.102
1505	243 0622.468	243 0622.565	20362	-0.097
1506	243 0639.672	243 0639.769	20368	-0.097
1507	243 0662.604	243 0662.707	20376	-0.103
1508	243 0665.470	243 0665.575	20377	-0.105
1509	243 0768.696	243 0768.798	20413	-0.102
1510	243 0771.565	243 0771.665	20414	-0.100
1511	243 0791.642	243 0791.736	20421	-0.094
1512	243 0986.614	243 0986.714	20489	-0.100
1513	243 1009.569	243 1009.652	20497	-0.083
1514	243 1049.699	243 1049.794	20511	-0.095
1515	243 1766.529	243 1766.622	20761	-0.093
1516	243 1783.726	243 1783.826	20767	-0.100
1517	243 1786.597	243 1786.693	20768	-0.096
1518	243 2437.480	243 2437.573	20995	-0.093
1519	243 2451.815	243 2451.910	21000	-0.095
1520	243 2520.630	243 2520.725	21024	-0.095

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
1521	243 2761.476	243 2761.579	21108	-0.103
1522	243 2807.363	243 2807.456	21124	-0.093
1523	243 2827.439	243 2827.528	21131	-0.089
1524	243 2910.588	243 2910.680	21160	-0.092
1525	243 2913.452	243 2913.547	21161	-0.095
1526	243 2930.656	243 2930.751	21167	-0.095
1527	243 2930.660	243 2930.751	21167	-0.091
1528	243 3174.386	243 3174.472	21252	-0.086
1529	243 3174.388	243 3174.472	21252	-0.084
1530	243 3188.724	243 3188.809	21257	-0.085
1531	243 3188.724	243 3188.809	21257	-0.085
1532	243 3194.459	243 3194.543	21259	-0.084
1533	243 3228.867	243 3228.951	21271	-0.084
1534	243 3561.469	243 3561.559	21387	-0.090
1535	243 3561.473	243 3561.559	21387	-0.086
1536	243 3888.357	243 3888.433	21501	-0.076
1537	243 3928.494	243 3928.575	21515	-0.081
1538	243 3928.496	243 3928.575	21515	-0.079
1539	243 4272.571	243 4272.652	21635	-0.081
1540	243 4576.511	243 4576.587	21741	-0.076
1541	243 4705.540	243 4705.616	21786	-0.076
1542	243 4705.540	243 4705.616	21786	-0.076
1543	243 4714.150	243 4714.218	21789	-0.068
1544	243 5032.413	243 5032.490	21900	-0.077
1545	243 5376.503	243 5376.567	22020	-0.064
1546	243 5442.443	243 5442.516	22043	-0.073
1547	243 5746.375	243 5746.451	22149	-0.076
1548	243 6173.608	243 6173.680	22298	-0.072
1549	243 6551.967	243 6552.165	22430	-0.198
1550	243 6626.647	243 6626.715	22456	-0.068
1551	243 6858.898	243 6858.967	22537	-0.069
1552	243 6861.765	243 6861.835	22538	-0.070
1553	243 6861.766	243 6861.835	22538	-0.069
1554	243 7185.780	243 7185.841	22651	-0.061
1555	243 7208.720	243 7208.779	22659	-0.059
1556	243 7251.729	243 7251.789	22674	-0.060
1557	243 7251.732	243 7251.789	22674	-0.057
1558	243 7274.671	243 7274.728	22682	-0.057
1559	243 7274.674	243 7274.728	22682	-0.054
1560	243 7294.751	243 7294.799	22689	-0.048

TIMES OF PRIMARY MINIMUM AND RESIDUALS OF ALGOL

NO.	JUL. DATE OBSERVED	JUL. DATE CALCULATED	E	(O-C)
1561	243 7317.678	243 7317.737	22697	-0.059
1562	243 7572.871	243 7572.928	22786	-0.057
1563	243 7595.807	243 7595.866	22794	-0.059
1564	243 7595.806	243 7595.866	22794	-0.060
1565	243 7598.677	243 7598.734	22795	-0.057
1566	243 7598.677	243 7598.734	22795	-0.057
1567	243 7621.613	243 7621.672	22803	-0.059
1568	243 7641.683	243 7641.743	22810	-0.060
1569	243 7641.683	243 7641.743	22810	-0.060
1570	243 7965.699	243 7965.750	22923	-0.051
1571	243 8011.581	243 8011.627	22939	-0.046
1572	243 8014.445	243 8014.494	22940	-0.049
1573	243 8017.314	243 8017.361	22941	-0.047
1574	243 8054.594	243 8054.636	22954	-0.042
1575	243 8054.597	243 8054.636	22954	-0.039

TABLE II
 AVERAGE RESIDUALS OF VISUAL OBSERVATIONS
 AND INDIVIDUAL RESIDUALS OF PHOTOELECTRIC OBSERVATIONS

No.	E	(O-C)	Wt.
1	111	-0.027	48
2	341	-0.025	10
3	647	-0.016	1
4	845	-0.013	18
5	1089	+0.006	4
6	1379	+0.002	2
7	1641	+0.022	3
8	1900	+0.026	8
9	2086	+0.037	4
10	2626	+0.046	7
11	3347	+0.073	2
12	3550	+0.078	1
13	3950	+0.084	1
14	4132	+0.101	2
15	4458	+0.107	3
16	4658	+0.112	4
17	4794	+0.112	3
18	5201	+0.122	1
19	5426	+0.142	4
20	5559	+0.140	2
21	6048	+0.150	2
22	6264	+0.164	2
23	7394	+0.189	11
24	7646	+0.187	8
25	7795	+0.201	1
26	8072	+0.184	7
27	8294	+0.172	21
28	8534	+0.167	16
29	8867	+0.164	13
30	9130	+0.149	77
31	9386	+0.146	62
32	9610	+0.132	71
33	9878	+0.122	68
34	10099	+0.119	32
35	10408	+0.120	23
36	10631	+0.110	39
37	10894	+0.105	27

No.	E	(O-C)	Wt.
38	11130	+0.094	54
39	11391	+0.091	35
40	11605	+0.089	28
41	11894	+0.072	43
42	12147	+0.050	25
43	12403	+0.046	36
44	12611	+0.032	31
45	12881	+0.019	25
46	13159	+0.004	7
47	13390	-0.007	16
48	13652	-0.018	19
49	13879	-0.026	44
50	14067	-0.020	17
51	14371	-0.032	27
52	14617	-0.039	26
53	14860	-0.043	18
54	15123	-0.046	37
55	15333	-0.047	21
56	15622	-0.046	25
57	15872	-0.049	29
58	16098	-0.055	31
59	16409	-0.056	14
60	16663	-0.077	20
61	16923	-0.097	13
62	17111	-0.104	13
63	17404	-0.121	2
64	17467	-0.103	pe
65	17571	-0.112	pe
66	17666	-0.106	11
67	17699	-0.107	pe
68	17876	-0.111	11
69	17953	-0.110	pe
70	18418	-0.113	21
71	18219	-0.110	pe
72	18348	-0.112	pe
73	18384	-0.105	26
74	18458	-0.105	pe
75	18507	-0.110	pe
76	18620	-0.103	42
77	18721	-0.103	pe
78	18845	-0.103	pe
79	18874	-0.101	23

No.	E	(O-C)	Wt.
80	18985	-0.102	pe
81	19136	-0.096	pe
82	19154	-0.102	13
83	19208	-0.098	pe
84	19396	-0.097	36
85	19487	-0.099	pe
86	19511	-0.106	8
87	19599	-0.095	pe
88	19616	-0.095	pe
89	19734	-0.101	pe
90	19853	-0.099	2
91	19878	-0.100	pe
92	19989	-0.103	pe
93	20121	-0.087	1
94	20368	-0.097	pe
95	20386	-0.100	10
96	20511	-0.095	1
97	20823	-0.096	4
98	21000	-0.095	pe
99	21097	-0.097	3
100	21124	-0.093	pe
101	21131	-0.089	pe
102	21167	-0.095	pe
103	21167	-0.091	pe
104	21252	-0.086	pe
105	21257	-0.085	pe
106	21259	-0.084	pe
107	21271	-0.084	pe
108	21298	-0.085	3
109	21387	-0.090	pe
110	21515	-0.081	pe
111	21598	-0.078	4
112	21786	-0.076	pe
113	21824	-0.074	3
114	22043	-0.073	pe
115	22084	-0.070	2
116	22298	-0.072	pe
117	22456	-0.068	pe
118	22537	-0.069	pe
119	22538	-0.070	pe
120	22538	-0.069	pe
121	22651	-0.061	pe
122	22659	-0.059	pe
123	22674	-0.060	pe

No.	E	(O-C)	Wt.
124	22672	-0.057	pe
125	22682	-0.057	pe
126	22682	-0.054	pe
127	22689	-0.048	pe
128	22697	-0.059	pe
129	22786	-0.057	pe
130	22794	-0.059	pe
131	22794	-0.060	pe
132	22795	-0.057	pe
133	22795	-0.057	pe
134	22803	-0.059	pe
135	22810	-0.060	pe
136	22810	-0.060	pe
137	22923	-0.051	pe
138	22939	-0.046	pe
139	22940	-0.049	pe
140	22941	-0.047	pe
141	22954	-0.042	pe
142	22954	-0.039	pe

Table III. Fourier Coefficients

A_0	A_1	A_2	A_3	A_4	A_5	A_6	A_7
0.0225	0.1382	-0.0031	-0.0052	0.0009	0.0036	-0.0010	0.0022
B_1	B_2	B_3	B_4	B_5	B_6	B_7	
0.0010	-0.0128	0.0024	0.0017	0.0044	-0.0062	0.0031	

Table IV. Relationship between n and $k(n)$

n	k
0	0.750
1	0.260
1.5	0.145
2	0.074
3	0.0145
4	0.0013
5	0